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# Red Hill Creek Expressway North-South Section

DRAFT

## Draft Summary Report

Vol. 2  
July 1998

## Impact Assessment and Design Process



Ministry  
of  
Transportation  
Ontario

## Focused on Design and Construction

The Region is currently focused on the design and construction of the Red Hill Creek Expressway. The purpose of this document, therefore, is to provide concerned parties an understanding of:

- Changes that have been made to the Expressway design approved in 1985;
- Impacts of the current Expressway design on features within the Red Hill Valley, the adjacent neighbourhoods and along the Queen Elizabeth Way;
- How impacts will be reduced (mitigation); and
- Future opportunities for community input to the design of this project.

Since June of 1997, the Region has advertised and held over a dozen public meetings related to the design of the Red Hill Creek Expressway. At every event participants have expressed concerns about the impacts this project will have on the Red Hill Valley and the people living in adjacent neighbourhoods. Some have also questioned the need for the Expressway, and whether or not alternative locations have been considered.

The Region initially addressed need and alternative locations in 1982 and in 1985, when the Joint Hearing Board approved the Red Hill Creek Expressway. The Region and Ministry of Transportation then revisited the need for the project in the 1990's.

The conclusions of these planning studies have not changed. The east end of Hamilton still lacks the roadway capacity needed to meet future (year 2020) peak-hour traffic demands across the Niagara Escarpment in the northbound and south-bound direction. Alternatives to the Red Hill Valley route were examined but due to cost, neighbourhood disruption and environmental impact, none are considered more acceptable than the current Expressway project.

The following documents that support these conclusions are available at the Region and in the Central Hamilton Library:

- Region of Hamilton-Wentworth, Mountain East-West and North-South Transportation Corridor (Volumes 1 and 2) – Environmental Assessment Submission, December 1982
- Joint Hearing Board Report, October 1985
- Ontario Ministry of Transportation, Technical Report – The Red Hill Creek Four Lane Road, March 1994
- Region of Hamilton-Wentworth, Red Hill Creek 4-Lane Road – Technical Memoranda, July 1994
- Regional Transportation Review, Final Report, April 1996

Information presented in this document is a product of the Impact Assessment and Design Process the Region was authorized to carry out by the Ministry of Environment, in March 1997.

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# Executive Summary

DRAFT SUMMARY

**B**UILDING AN EXPRESSWAY in the Red Hill Valley will result in significant changes. However, over the past twelve months, the Region has reduced the impacts that will be caused by the road's construction and operation. Major improvements have been proposed in the design of the creek, and in the Expressway design approved in 1985. This has been accomplished through intensive discussion with agencies and the public.

How is the 1985 Expressway design different from the 1998 design? Is the Region on schedule? Answers to these questions and others listed below are documented in this Executive Summary:

- Who is assisting the Region, MTO and the community with this work?
- What does the project include?
- What impact will the project have on the natural environment and the adjacent neighbourhoods, and what strategies will be used to reduce the predicted impacts?
- What will be the cost and is it within budget?
- Will there be further opportunities for community input to this project?

*Note: A more detailed record of project impacts is provided in Draft Summary Report Volume 2 and supporting Technical Reports.*

## How is the 1985 Expressway design different from the 1998 design?

**D**IFFERENCES BETWEEN the 1985 Expressway design and the 1998 design are illustrated in **Figure 1** and highlighted below:

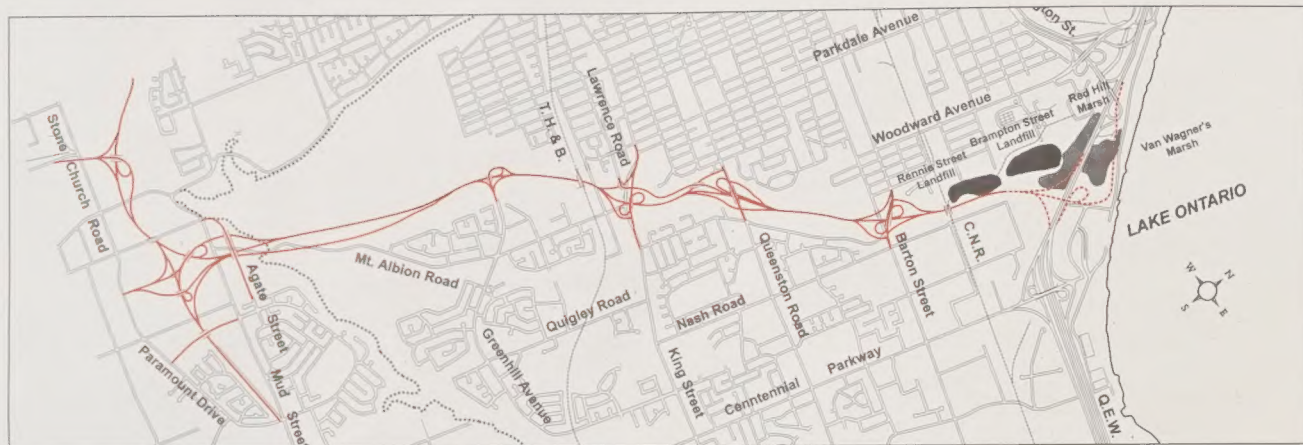
1985 Expressway Design	1998 Expressway Design
3 northbound and 3 southbound through lanes	2 northbound and 2 southbound through lanes
Dual expressway crossings of the Niagara Escarpment (on a 7% grade) to allow the northbound and southbound lanes to straddle Ontario Hydro transmission lines	Single combined crossing of the Niagara Escarpment (on a 4% grade) with possible structure on the west side of the Ontario Hydro transmission lines
Interchanges at Mud Street, Greenhill Avenue, King Street, Queenston Road, Barton Street, and a connection to the QEW (a proposal was developed in 1990 by MTO)	Interchange modifications made at: Greenhill Avenue, Queenston Road, Barton Street, QEW/Expressway and QEW at Burlington Street
Basket weave ramps between Queenston Road and King Street	No basket weave ramps between Queenston Road and King Street
4 km of creek banks in concrete channel	Natural channel design approach minimizes the need for concrete treatments
14 Expressway crossings of Red Hill Creek (in addition to existing bridges and culverts)	8 Expressway crossings of Red Hill Creek (in addition to existing bridges and culverts)
Pedestrian access over Expressway near Escarpment and at Melvin Avenue	Pedestrian access provided at Escarpment, Greenhill Avenue interchange and Barton Avenue Interchange. Pedestrian/cyclist access also enhanced under QEW at Woodward Avenue.

How is the 1985 Expressway design different from the 1998 design?

## DRAFT SUMMARY

Figure 1:

1985 Expressway Design



1998 Expressway Design



In terms of natural environment and neighbourhood impacts, differences between the 1985 and 1998 Expressway design are as follows:

### Red Hill Creek Expressway (Mud Street to Brampton Street)

**Vegetation and Wildlife** - the current proposal has less paved surface and better wildlife migration opportunities as a result of the proposed structures and creek realignment to the west side of the Expressway.

**Fisheries** - current creek realignment activities allow for the creation of fish habitat in areas that would have not been possible under the previous design.

**Water Quality/Quantity** - the natural channel design approach associated with the current design allows the Region to reduce sediment loading to Hamilton Harbour. Stormwater quality facilities and the new Red Hill Valley CSO pipe will not only address Expressway runoff but also make significant and immediate improvements in water quality conditions consistent with the Red Hill Creek Watershed Plan.

**Trails** - the current proposal incorporates a trail system whereas the 1985 Expressway design did not.

### QEW (Highway 20 to Burlington Street)\*

**Vegetation and Wildlife** - the current proposal reduces wetland loss from Van Wagners Wetland and Red Hill Marsh by 1.5 hectares (total loss now equals 0.6 hectares).

**Residential** - the current proposal displaces no residential properties (1990 proposal displaces 6).

**Confederation Park** - the current proposal causes less disruption to park activities (i.e., relocates a shorter section of Van Wagners Road, causes less QEW traffic encroachment in active recreational areas).

**Site Contamination** - the current proposal avoids crossing the former Stoney Creek Landfill.

**Utilities** - the current proposal allows expansion of the Region's water pumping station in the Burlington Street interchange area.

**Cost** - the current proposal saves provincial taxpayers approximately \$50 Million in additional road construction cost.

\* Comparison is based on MTO's 1990 Red Hill Creek Expressway/QEW interchange design.

## Is the Region on schedule?

YES, WE ARE COMPLETING the preliminary design as per our schedule and now entering detail design and construction.

### Design and Construction Phase

Over the next year, the Region/MTO will advance the project into detail design and finally to construction. As this process evolves, project expenditures increase substantially. Therefore, from a scheduling and cost perspective, it is important to reach agreement on design issues and impact reduction strategies now rather than later.

### Could reported impacts of this project change between now and construction?

In most cases, no, but some aspects of the project will evolve with the design. For example, the creek realignment that is currently proposed will be refined through detail design. Although the general location will be set before construction, the final alignment must be determined in the field to respond to local topography and vegetation.

### Construction Schedule

The Region will start construction of the 'Line' extension from Dartnall Road to Mud Street in the fall of 1998. This section of roadway is expected to be open to traffic in the fall of 1999.

Construction from the top of the Niagara Escarpment, through the Red Hill Valley and along QEW (Highway 20 to Burlington Street) will begin after remaining permits and approvals are granted. It is anticipated that contract tenders will be called in the summer/fall of 1999.

Completion of the work is expected in fall of 2002. At that time the Expressway will be open to traffic.

## Is the Region on schedule?



Who is assisting the Region, MTO and the community with this work?

What does 'the project' include?

Who is assisting the Region, MTO and the community with this work?

THE REGION HAS ASSEMBLED a diverse team of environmental and design specialists with provincial, national and in some cases international experience in the following fields:

Environmental Planning  
Wildlife & Plant Ecology  
Fisheries  
Stream Design  
Air Quality  
Noise Assessment  
Archaeology  
Built Heritage  
Site Contamination  
Landscape Architecture  
Groundwater  
Engineering Design  
Water Quality/Flood Control  
Architecture Detailing/Urban Design

In addition, a professional facilitator has been retained to facilitate community meetings.

Overall, the level and diversity of specialized skill that has been committed to a highway project of this size is unprecedented in this Region or the Province of Ontario.

What does 'the project' include?

THERE ARE FOUR KEY components to the project (see Map 1):

## 1. The Expressway

The Region will construct and cost share with the Ministry of Transportation (MTO) a four-lane roadway (i.e., two northbound through lanes and two southbound through lanes with a median in the middle) that extends from the Lincoln Alexander Parkway to a point immediately south of the QEW/ Expressway interchange. A fifth lane in the southbound direction will be added in the vicinity of the Niagara Escarpment to accommodate slower moving up-bound traffic. Neighbourhood access to and from the Expressway will be provided at Mud Street, Greenhill Avenue, King Street, Queenston Road, and Barton Street. Special pedestrian/cyclist access to destinations east and west of the Expressway will be provided at the Niagara Escarpment, Greenhill Avenue interchange, Barton Street interchange and under the QEW at Woodward Avenue. The following road closures will also occur immediately prior to the Expressway opening or as necessary to accommodate construction:

- Mt Albion Road - just south of the Glendale Golf And Country Club access,
- Pottruff Road - at Barton Street
- Nash Road - south of Brampton Street
- Brampton Street - west of Kenora Avenue

- Melvin Avenue - on west side of valley
- The MTO will construct and fund entirely the QEW/Expressway interchange as well as improvements to the QEW/ Burlington Street interchange required to ensure the continued safe operation of this provincial roadway.

## 2. Red Hill Creek Natural Channel Realignment

As a result of past development activity, the portion of Red Hill Creek that extends from approximately the TH&B rail to Barton Street erodes at an abnormally high rate. This has caused the Creek to become very unstable, i.e., it frequently erodes its banks due to high storm runoff volumes and velocities; it destroys fish habitat, stream banks, trees and other vegetation.

Measures to correct this problem have been incorporated in the Expressway project. The current approach is based on natural channel design principles. This means the Region will realign a 5-km section of the Red Hill Creek and associated floodplain along the west side of the Expressway in a pattern consistent with local topography, geology and vegetation. The new creek alignment will be stabilized with natural materials instead of concrete channels. Over the long term, maintenance costs are expected to be significantly lower than a creek lined with concrete. The existing concrete channel at Queenston Road will be replaced with a more natural design and existing concrete saddles south of King Street will be removed.

The Federal Department of Fisheries and Oceans, who is responsible for authorizing work associated with fish habitat, sup-

ports the Region's use of a natural channel design approach.

Overall, it reduces the number of additional times the Expressway crosses Red Hill Creek from 14 to 8.

## 3. Stormwater Management Facilities

Storm detention areas will prevent flooding of the Expressway and the QEW during major storm events, and stormwater ponds will treat runoff from the Expressway to ensure no further degradation of the water quality of Red Hill Creek and Hamilton Harbour.

## 4. Red Hill Combined Sewer Overflow Pipe

Combined Sewer Overflow (CSO) outfalls in the Melvin Avenue/Heath Street, Queenston Road and Lawrence Road areas discharge sewage and stormwater pollution directly to Red Hill Creek. The Region has received Ministry of the Environment approval to construct a CSO pipe to address these discharges.

Within the Expressway right-of-way, the Region will construct a 2.2 to 3.0 metre diameter CSO pipe from Lawrence Road to the CNR tracks north of Barton Avenue. The new facility will reduce the number of times CSO pollution reaches the Red Hill Creek from 20 - 27 to approximately 2 times per year.

The ability to build this pipe with the Expressway means that the pollution problem can be addressed much sooner than previously anticipated and at a lower cost.

## What impact will the project have on the natural environment and the adjacent neighbourhoods, and what can be done to reduce the predicted impacts?

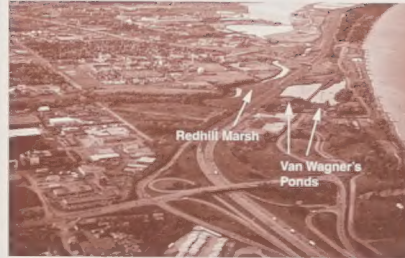
**MAP 2** ILLUSTRATES the positive and negative impacts of the project.

**Map 3** illustrates the mitigation/opportunities the Region is working on to reduce this project's impacts.

### Vegetation and Wildlife

**Within the Valley study area** (i.e., the Red Hill Valley between Mud Street and Brampton Street) there is approximately 292 hectares of open space/natural area containing a variety of vegetation communities and wildlife habitats. This includes: agricultural areas (i.e., cultivated fields and nurseries), open space (i.e., recreational and landscaped areas), human-made woodland/forest (i.e., plantations, cultural woodlands and non-native forests), natural woodland/forest (i.e., valley slope, floodplain and escarpment complex woodlands and forests), successional areas (i.e., old field and other regeneration areas), and wetland areas (i.e., marsh and swamp).

- Approximately 25% (or 75 hectares) of this area will be cleared as a result of project construction. Of this figure: approximately 10% is open space, 50% is natural woodland/forest, 37% is successional, and 3% is wetland. Some of these habitats are considered significant and are known to support rare species of vegetation and wildlife. These figures may change slightly after detail design when stormwater management and creek realignment work has been finalized.
- Another 25% (or 74 hectares) of this area may be negatively impacted by Expressway construction activities (e.g., dust, erosion, sedimentation, etc.) and traffic operation (e.g., salt spray, noise, pollution, etc.). The full extent of impact will be monitored and mitigated after construction.
- The estimated number of trees removed (i.e., trees with trunk diameters greater than 5 centimeters) is approximately 40,000. Earlier estimates by community sources quote 47,000. Discrepancies between the two estimates are likely attributable to where sampling was conducted (i.e., dense immature forest and plantation vs. more open areas and mature forest). Nonetheless, both estimates are effective at highlighting the extent of tree loss in the valley.
- Impacts to ecosystem functions (e.g., core areas and wildlife corridors) along the Niagara Escarpment, and along the Red Hill Valley will be high (i.e., cannot be mitigated) regardless of changes made during detail design and construction. This is due to the permanent loss of vegetation and wildlife habitats within the study area, and the severance of a



Lake Ontario Corridor



Niagara Escarpment Corridor



Red Hill Valley Corridor North/South of Queenston Rd.

What impact will the project have on the natural environment and the adjacent neighbourhood, and what can be done to reduce the predicted impacts?



primary wildlife corridor that connects the Lake Ontario shoreline to the Niagara Escarpment and beyond.

Within the QEW study area (i.e., north of Brampton Street to the Lake Ontario shoreline, between Highway 20 and the Burlington Street interchange) there are 134 hectares of open space/natural area containing a variety of vegetation communities and wildlife habitats:

- Approximately 14% (or 18 hectares) of this area will be cleared as a result of construction activity. Of this figure: approximately 39% is open space, 1% is natural woodland/forest, 1% is aquatic, 6% is natural woodland/forest, 50% is successional, and 3% is wetland. Some of these habitats are considered significant and are known to support rare species of vegetation and wildlife.
- Approximately 0.6 hectares (or 4%) of Van Wagner's Ponds, a Provincially Significant Wetland, will be directly impacted through project construction. The loss to wetland function is considered high. This is due primarily to the loss of known breeding habitat for Least Bittern, a rare bird species. Attempts will be made to recreate similar habitats in the vicinity of the wetland.

The Region has established a Landscape & Restoration Advisory Group (LRAG) to provide advice in the development of a plan to guide the re-creation and restoration of vegetation communities and wildlife habitats. The Red Hill Creek Watershed Plan has identified opportunities for habitat improvement, re-creation and restoration and this has provided guidance to the restoration plan. To date, a number of important strategies have emerged from this process (see Map 3).

## Red Hill Creek Stability

The Region will utilize a natural channel design approach to resolve the creek erosion problems that persist from the Kings Forest Golf Course through to Barton Street. Regardless of the Expressway, if corrective measures are not used, the creek will eventually widen to five times its present width and permanently remove approximately 30% of the vegetation that exists within the valley.

## Fish Habitat

Removal of the Queenston Road channel and concrete saddle south of King Street; the provision of bridges in some areas rather than culverts; and creek stabilization works described earlier, will all improve the quality and quantity of fish habitat in Red Hill Creek. In other words, when the project is completed there will be an overall increase in the quality and quantity of fish habitat in Red Hill Creek.

The Federal Department of Fisheries and Oceans (DFO) must authorize any removal or modification of fish habitat. DFO will not approve habitat destruction without proper compensation. Habitat compensation plans are usually developed during detail design when engineering details and other impact reducing works are being finalized. Replacement of habitat is the preferred form of compensation and the Region's goal.



Channel Bank Erosion



Queenston Road Concrete Channel



The Region's fishery biologist releasing fish after sampling



## Water Quantity and Quality

Stormwater detention areas are being designed to protect the Expressway and QEW from major storm events.

Stormwater quality facilities (i.e., CSO storage pipe, and stormwater quality wetlands, wetponds and grass swales) will result in a net reduction in annual contaminant loading to the Red Hill Creek and Hamilton Harbour. This, coupled with creek stability works, will produce major water quality benefits to the Red Hill Creek and Hamilton Harbour.

## Air Quality

Air quality impacts have been assessed at both a Region wide and local scale.

### Region Wide (Region of Hamilton-Wentworth)

Based on Year 2020 peak "rush hour" predictions, the Red Hill Creek Expressway will decrease vehicle emissions in the Region by 3 to 16%.

Prediction results also indicate that temperature changes associated with vegetation loss and increased pavement in Red Hill Valley will be Regionally insignificant.

### Local (Red Hill Valley)

The following results are based on predictive models that assume worst-case scenarios for vehicle emissions at 150 locations within and immediately adjacent to the Red Hill Valley, including places where people live, go to school, or play:

- Carbon Monoxide (CO) concentrations will remain to be well within Provincial air quality criteria (i.e., Ministry of the Environment Ambient Air Quality Criteria).
- Nitrogen Dioxide (NO<sub>2</sub>) concentrations will remain within Provincial air quality criteria.
- Particulate Matter (PM<sub>10</sub>, small dust particles that are inhalable) concentrations are predicted to exceed the interim provincial criteria at most receptors, 13% of the time. Two receptors (i.e., 600 metres northeast of Queenston Road immediate adjacent to the Expressway, and the Glencastle playing fields) are predicted to exceed the interim provincial criteria by 4 to 5 times\*.
- Total Suspended Particulate (all sizes of dust particles) is also predicted to exceed the provincial criteria at most receptor locations, 13% of the time. The maximum exceedance at the



Stormwater quality pond two growing seasons after construction



Air quality monitoring station



Glencastle soccer fields

Glencastle location is in the order of 4 times\* the provincial criterion.

Roadway maintenance strategies such as road cleaning (i.e., wet sweeping and flushing of the roadway surface) and alternative approaches to de-icing, will be investigated as possible ways to reduce TSP and PM10 levels. As well, a post-construction monitoring program will be considered in the Glencastle area along with tree plantings in the immediate vicinity of the Expressway.

Special consideration will be given to relocating Glencastle playing fields and sections of the Red Hill Valley Recreation Trail.

Finally, prediction results indicate that temperature changes associated with vegetation loss and increased pavement in Red Hill Valley will be minor (i.e., temperatures will increase by approximately 2 degrees Celsius within 120 metres of the roadway).

\* Prediction results appear to be highly conservative. Monitoring work carried out along Highway 404 in Markham shows actual levels of PM10 and TSP to be 3 to 4 times lower than Regional predictions and this is with approximately 25% more traffic than the Expressway will carry during peak travel periods. Therefore, it is likely that the predictions for the Expressway are much higher than would likely be realized. Nevertheless, the potential health effects of even marginally high PM10 levels are now being examined.

## Noise

Without noise barriers, existing sound levels in residential backyard areas from the Greenhill Avenue area to Brampton Street will increase by up to 20 dBA (dBA - decibels of sound averaged over a 24 hour period). People experience increases in sound levels the following ways:

- < 3 dBA is not noticeable;
- 4 to 5dBA is considered just-noticeable;
- 6 to 9 dBA is considered marginally significant; and,
- >10 dBA is considered significant on an increasing basis.

Noise levels along the QEW are not expected to increase more than 3 dBA as they are already high.

Ways to reduce noise levels (i.e., barriers) will be investigated during detail design.

Investigations will be focused along most of the Expressway corridor (see Map 3). If barriers are feasible, they can reduce noise increases by 5 to 10 dBA.



Noise barrier on East-West Line



## Cultural Heritage (Archaeological Sites, Built Heritage Features and Cultural Landscapes)

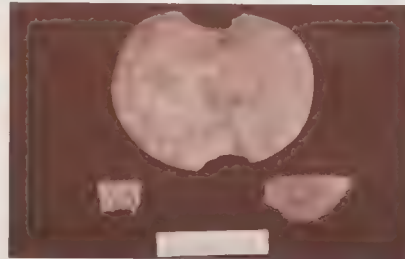
- A total of 21 archaeological sites will be potentially impacted by road works in the Red Hill Valley and along the QEW (18 and 3, respectively). Of these sites some are minor and have already been properly documented while others are more significant and require excavation and salvage of artifacts. No human remains have been uncovered, however, should this happen, the appropriate authorities will be contacted as per provincial requirements. Archeological assessment will be ongoing throughout the remaining phase of design and construction.
- A total of 10 built heritage features will be potentially impacted by road works in the Red Hill Valley (none along the QEW). Where features cannot be retained they will be documented.
- A total of 15 cultural landscape units (i.e., areas that have been altered by humans) will be impacted by road works in the Red Hill Valley and along the QEW (13 and 2, respectively). In all cases either no additional work is required because adequate information has already been collected or some form of protective measure is recommended to retain the landscape feature.
- All archaeological work must be carried out and documented to provincial standards using licensed professionals.

## Contaminated Sites

- Expressway construction will result in the excavation of 124,000 m<sup>3</sup> of material from the Rennie Street Closed Landfill. This includes 2000 m<sup>3</sup> of hazardous waste, 100,000 m<sup>3</sup> of non-hazardous waste and 22,000 m<sup>3</sup> of clean fill.
- Expressway construction will also intersect four sites in the Nash Road area that are potentially contaminated. Once acquired, site specific testing will be carried out during detail design to determine the type and extent of potential contamination.
- The waste on these sites will be managed as per Ministry of the Environment guidelines. The Region has assumed worst case clean-up conditions.



Red Hill Creek Valley Road



Selected Artifacts from the  
Recliner Site



Site Contamination

## Visual Resources (Niagara Escarpment)

All municipally proposed infrastructure projects within the Niagara Escarpment planning area must adhere to the guidelines and policies of the Niagara Escarpment Commission (NEC). Hence, the Region in agreement with NEC has undertaken a visual assessment study to determine the impact of expressway construction on the Niagara Escarpment.

Based on the current preliminary design for the Escarpment area, views of the Escarpment from trails within 0.5 km of the road, Kings Forest Golf Course Clubhouse and some sections of Mountain Brow Blvd. will experience a high visual impact as a result of

- a 70 metre wide and maximum 15 metre high rock cut through the Escarpment (at a 4% grade) with a possible retaining wall on the east side
- an elevated road in the section of the Escarpment, and
- an exposed hydro tower

Landscaping cannot reduce this impact.

Residents living along the Glencastle Drive/Forest Hill Crescent area whose backyards face the Expressway will experience a high visual impact as well.

As a result of this assessment, the Region will explore modifications to the current preliminary design and relocation of the hydro tower to reduce the visual impact of the crossing in consultation with the Niagara Escarpment Commission



View from King Forest Golf Club clubhouse terrace

## Existing/Future Land Use

### Trails and Pedestrian Accesses:

- Red Hill Valley - a trail designed for pedestrian and cyclist use will be permanently established along the west side of Red Hill Valley from the Niagara Escarpment to Melvin/Barton Street. From that point, the valley trail will connect to Woodward Avenue, and under the QEW to the waterfront trail system. Streetscape improvements to Woodward Avenue and the QEW crossing will be made to ensure safe pedestrian and cyclist access.
- Bruce Trail - the section of trail impacted by the Expressway will be realigned to connect under the proposed structure located near the foot of the Niagara Escarpment.
- Greenhill Avenue Interchange - will provide pedestrian/cyclist access to the Valley.
- Barton Avenue Interchange - will provide pedestrian/cyclist access from Pottruff Road.



Red Hill Valley Recreation Trail



Rosedale Park baseball diamonds



Warrants for school crossing guards will be examined at the Greenhill/Harrisford and Barton Street crossing locations.

#### Recreational Parks/Golf Courses:

Glencastle Park - Expressway embankments and air quality predictions directly impact the 3 soccer fields located in this area. Discussions regarding the future suitability of this site for active recreational use will take place prior to detail design.

Rosedale Park - the final realignment of Red Hill Creek could result in the displacement of 1 to 3 baseball diamonds near the Combined Sewer Overflow tank.

Opportunities to replace and possibly increase the number of ball diamonds in the immediate area will be examined when the final creek alignment is determined in detail design.

Globe Park - proposed stormwater and fishery/wildlife habitat works may require the displacement of one baseball diamond. The feasibility of using this site will not be known until soil contamination work is carried out during detail design.

Confederation Park - modifications to the Burlington Street interchange will impact Van Wagner's Pond and relocate a 450 metre section of Van Wagner's Road. An informal trail along the abandoned rail line will also be interrupted.

Burlington Street/Woodward Avenue Parkette - the proposed realigned ramp from Burlington Street to Woodward Avenue will impact an existing parkette. A plan to minimize impacts will be developed during detail design.

Woodward Avenue South Extension - the unused extension of Woodward Avenue south of Melvin Avenue could be used for recreational purposes. A plan to develop this land for this purpose will be produced during detail design.

Kings Forest Golf Course - minor impacts may occur from creek realignment activities. Details will not be known until detail design is completed.

When the project reaches completion, it is anticipated that the City of Hamilton representatives will be involved in the final design and construction phases.

#### Residential Property

Land from the rear lot limits of 3 residential properties adjacent to the Valley will be required. The Region will negotiate a fair market settlement with each landowner.

#### Open Space (consisting of natural and recreational areas)

In total, approximately 70 hectares of public open space (as designated by the Official Plan) will be directly impacted. Of this, the Expressway will permanently remove 60 hectares and the remaining area will be temporarily disrupted by creek realignment and stormwater management works.

#### Industrial Property

In total, land from 3 privately owned industrial properties is required. The Region will negotiate a fair market settlement with each landowner.

#### Utilities and Rail

Plans are underway to relocate a 750-metre section of the Trans Northern pipeline within the Expressway corridor in the vicinity of the Escarpment.

As well, discussions are progressing with CN to address rail line issues north of Barton Street and Ontario Hydro to ensure there are no impacts to existing transmission towers. This may require the relocation of some towers.

The Region/MTO, however, will assess the Water Pumping Station Infrastructure and long term maintenance of the intake pipes at the Burlington Street Interchange.

## What will be the cost and is it still within budget?

**C**OSTS ASSOCIATED with the Regional portion of the aforementioned work is in the order of \$136 Million which is still within the approved budget.

## What will be the cost and is it still within budget?

Will there be further opportunities for community input to the design of this project?

## Will there be further opportunities for community input to the design of this project?

**YES.** THE REGION AND MTO will continue to work with the Community Stakeholder Committee (CSC) that was established in September 1997. The CSC provides the Region/MTO advice and recommendations on matters affecting the Expressway design and impact reduction measures (i.e., mitigation). For now, the CSC has agreed to provide advice/recommendations to the Region/MTO regarding staff's selection of a preferred Expressway design and proposed mitigation strategies.

The next stage of the project (detail design) will involve further refinements to the project design and the development of detailed mitigation plans. The following will be discussed with government agencies, community groups and adjacent residents (where appropriate) over approximately the next 6 to 8 months:

**Trail Relocation and Pedestrian Access** (i.e., Bruce Trail, Red Hill Valley Recreational Trail, Van Wagner's Marsh Trail, Woodward Avenue/QEW Access, Greenhill Avenue Access and Barton Street Access).

### **Recreational Parks**

(i.e., Rosedale Park baseball diamonds, Burlington Street parkette, Kings Forest Golf Course, Globe Park baseball diamonds, Glencastle Park soccer fields, and the proposed Linear Park along the Woodward Avenue right-of-way south of Melvin Avenue)

### **Wildlife and Plant Habitat Restoration, and Landscaping**

(i.e., Greenhill Avenue interchange and street design, Queenston Road to Barton Street - top of valley along the east bank, and gateway treatments at King Street/Queenston Road/Barton Street interchanges)

### **Noise Barriers**

(i.e., in the areas where warranted)

### **Air Quality**

In light of the predicted air quality, the Region will ensure that all findings and recommendations of government agency reviewers, community organizations such as the Hamilton Air Quality Initiative study team, and the Region's consultants, are communicated to area residents and users of recreational areas adjacent to the Expressway.

A more detailed account of consultation activities is described in the Region's *Red Hill Creek Expressway Impact Assessment and Design Process - Draft Summary Report Volume 2* document. Any community group that wishes to participate in the detailed design process should express their interest to the Region immediately.



# Introduction

## CHAPTER 1

### 1.1 Background

In December 1982, the Region of Hamilton-Wentworth submitted an Environmental Assessment (EA) under the Environmental Assessment Act which documented the need, scope and timing for the expansion of the Regional roadway network. Conclusions reached in the EA address the construction of a roadway that connects Highway 403 in Ancaster to the Queen Elizabeth Way (QEW) in the eastern portion of the City of Hamilton (see map). Project approval was subsequently granted by a Joint Hearing Board (i.e., Ontario Municipal Board and Environmental Assessment Board) in 1985, and later endorsed by Cabinet in 1987.

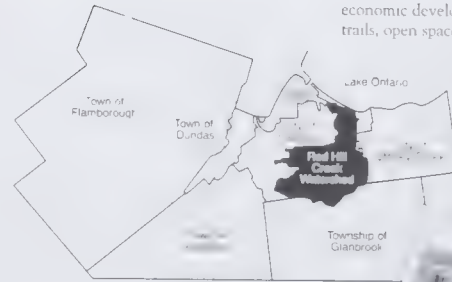
The roadway comprises two sections: the East-West "Mountain" section which has since been renamed the Lincoln M. Alexander Parkway (the "Linc"), and the North-South "Valley" section. Construction of the "Linc" proceeded in 1990 and was completed from Highway 403 to Dartnall Road in October, 1997. Construction of the Valley section, which is the focus of this Draft Summary Report, started in 1990 but due to the withdrawal of Provincial funding later that year, only partial work in the

vicinity of King Street and Queenston Road was completed. Since that time the Region has considered a number of design changes which will reduce impacts to environmental features/systems existing in and adjacent to the Red Hill Creek Valley.

In May 1996, the Region submitted an Exemption Order request to the Ministry of Environment and Energy to allow changes to be made to the original North-South section design. That document proposed an assessment process to guide the Region in obtaining the remaining government approvals and making final design changes to the original North-South alignment. In March 1997, the Minister of Environment and Energy approved the Region's Exemption Order request. The Region is now legally required to fulfill the commitments presented in that document.

In May 1997, the Region began work on the Red Hill Creek Watershed Plan. This work addresses the first of two major commitments the Region made in the Exemption Order. A first generation plan has been prepared and Regional Council has endorsed it in relation to actions for which the Region has jurisdiction.

The second major commitment the Region is currently fulfilling is called the Expressway Impact Assessment and Design Process (IADP). This document presents the results of the IADP.



economic development and land use, and trails, open space, recreation and cultural heritage. The need for immediate action in each issue area is supported by a State of the Watershed Report and a companion series of technical reports that describe current conditions in the watershed.

### 1.2 The Red Hill Creek Watershed Action Plan

The purpose of the Watershed Action Plan is to provide goals, objectives and general guidance for land and infrastructure development (e.g., the Red Hill Creek Expressway), conservation, restoration and rehabilitation efforts within the Red Hill Creek Watershed that reflect community values and have political support. The Plan was developed by approximately 35 stakeholders representing the interests of community groups, municipalities, businesses, federal and provincial agencies and major institutions.

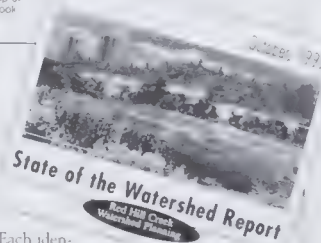
This first generation plan focuses on the issues stakeholders feel should be addressed immediately in the Red Hill Creek Watershed. These include: habitat protection and restoration, water quality and quantity, social development and health,

Each identified issue (or theme) contains a series of long term goals and corresponding action items that can (and should) be implemented immediately. To date, participants have suggested over 100 projects and activities which support the actions and that they are committed to lead, partner with other organizations and/or fund within the next five years. Over time new projects and activities will be added so that steps are continually being made to improve conditions in the watershed.

As a stakeholder, the Region will lead and pay for a number of watershed actions. The Expressway project can implement many actions. Details of these commitments are highlighted in Chapter 3.

### 1.1 Background

### 1.2 The Red Hill Creek Watershed Action Plan



## 1.3 Impact Assessment and Design Process

## 1.4 Draft Summary Report - Volume 2

### 1.3 Impact Assessment and Design Process

The Region is currently working with government agencies and community stakeholders to meet the following objectives:

- I. Establish a preliminary Expressway design (including modifications to the QEW and Burlington Street interchange) and mitigation/compensation strategies that will minimize project impacts.
- II. Generate information that will satisfy remaining government approvals.

In June 1997, the Region initiated an Impact Assessment and Design Process (IADP) to achieve those two objectives (see Figure 1.1).

The project is now entering into the detail design and construction phase of this process. During detail design, preliminary designs and mitigation/compensation strategies will be translated into detailed plans for construction and remaining government approvals will be obtained.

Assisting the Region with this work is a Community Stakeholders Committee (CSC), comprised of approximately 20 representatives of neighbourhood groups, businesses, and major institutions and a Government Agency Committee (GAC) comprised of provincial and federal government interests.

### 1.4 Draft Summary Report - Volume 2

As illustrated in Figure 1, two reports summarize the work that is being generated during the IADP:

Draft Summary Report - Volume 1 was distributed November 1997 to Regional Council, government agencies, the Community Stakeholders Committee and local libraries. A companion set of technical background reports was also made available.

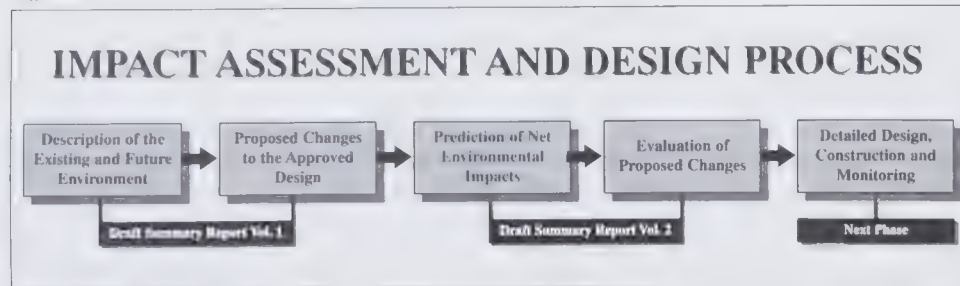
That report addressed the requirements of IADP Phases 1 and 2 (i.e., Existing Conditions Data Collection and Minor Expressway Refinements). Specifically, the report described existing/future natural environment and human settlement conditions that would likely be impacted by the

project; the current Expressway design, and proposed minor modifications. As requested, final comments on the document were forwarded by the Community Stakeholder Committee and government agencies to the Region in March 1998. On the whole, changes to the document were minor, since many comments referred to the next phase of the project.

Draft Summary Report Volume 2 (this document), addresses the two remaining phases of the IADP, specifically, impact prediction and mitigation, and evaluation of the 1990 and current Expressway/QEW design between Centennial Parkway and the Burlington Street interchange. The purpose of this work is to identify a preferred expressway design and set of mitigation strategies that can be incorporated during detail design and construction. Community input will continue to play an important role in the next phases of this project. Specific opportunities for community involvement are described in Chapter 4.

**IMPORTANT:** Once released, the community will have 10 weeks to review and comment on Draft Summary Report Volume 2 and the supporting technical reports.

Figure 1.1





# The Expressway Project

## CHAPTER 2

### 2.1 Project Components

All impact prediction and mitigation work must begin with a defined project. In this case, the Expressway Project has four components

- The Expressway (the road, its interchanges, the QEW, the Burlington Street interchange, and modifications to local roads, rail lines or utilities)
- Red Hill Creek Natural Channel Realignment
- Stormwater Management
- Combined Sewer Overflow Pipe

Each component of the current project is described below and illustrated on Map 1

### 2.2 The Expressway

Although the Region is carrying out the preliminary design work for the entire project, the Ministry of Transportation will be taking on the detail design and construction associated with the QEW area (Burlington Street interchange, QEW lanes and Expressway interchange at the QEW.)

#### Regional Responsibility (Lincoln Alexander Parkway to Brampton Street)

The Region will cost share with the MTO, a four-lane divided roadway that extends from the Lincoln Alexander Parkway to a point immediately south of the QEW/Expressway interchange along Red Hill Valley (see Map 1). After construction, the Region will assume responsibility for operating and maintaining the roadway

In general, the roadway will consist of the following features

- 2 northbound and 2 southbound through lanes (3.75 metres wide each);
- 1 climbing lane from Greenhill Avenue interchange to Pritchard Road (3.5 metres wide);
- Auxiliary/ramp lanes (3.5 metres wide) associated with interchanges;
- 8.5 metre median with concrete barrier across the escarpment and bridges;
- 15.5 metre landscaped median along all other sections of the Expressway; and,
- 90 km/hr posted speed

For safety reasons, the Region will separate the northbound and southbound through lanes with either an 8.5 metre wide (with concrete barrier) or a 15.5 metre wide (landscaped) median. The 8.5 metre median will be constructed along the section of roadway that extends through the Niagara Escarpment to Glencastle Drive (see Figure 2.1). This design reduces the amount of rock cut across the Escarpment and is better suited to the drainage requirements of this area (i.e., the Expressway's 4% grade greatly reduces the ability of a 15.5 landscaped

median to attenuate stormwater runoff). The remainder of the Expressway will be constructed with a 15.5 metre wide landscaped median (see Figure 2.1). The 15.5 metre wide median provides three benefits

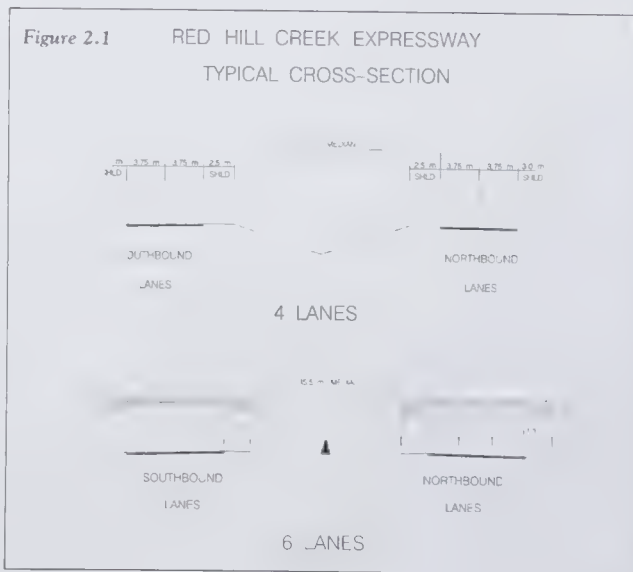
1. Accommodates any future widening without impacting on the landscape restoration work adjacent to the road or interchange ramps
2. It allows stormwater runoff to filter into the ground before reaching stormwater ponds, thus reducing the amount of land needed for water quality treatment

### 2.1 Project Components

### 2.2 The Expressway Regional Responsibility (Lincoln Alexander Parkway to Brampton Street)

Figure 2.1

#### RED HILL CREEK EXPRESSWAY TYPICAL CROSS-SECTION





## (2.2) The Expressway

MTO Responsibility  
QEW/Expressway  
Interchange, QEW,  
Burlington Street  
Interchange

## 2.3 Red Hill Creek Natural Channel Realignment

3. Saves the Region \$1.1 million/kilometer because sewers are not required for collecting stormwater

Vehicle access to and from the Expressway will be provided by interchanges located at Mud Street, Greenhill Avenue, King Street, Queenston Road, and Barton Street. Special pedestrian/cyclist access to destinations east and west of the Expressway will be provided at the Niagara Escarpment, Greenhill Avenue interchange, and Barton Street interchange.

Bridges and culverts have been designed to:

- Accommodate creeks and flooding,
- Provide wildlife passage and, where appropriate, trails,
- Ensure the long-term viability of the creeks alignment,
- Minimize impacts to the creek corridor, and,
- Be cost effective

The following road closures will also occur immediately prior to the Expressway opening:

Mount Albion Road - south of the Glendale Golf and Country Club access,

Pottrutt Road - south of Barton Street;

Nash Road - where it intersects with the Expressway,

Brampton Street - where it intersects with the Expressway; and,

Mud Street - at either side of the Expressway and just west of Paramount.

Since Draft Summary Report Volume 1 was issued in November 1997, the Region has made a number of minor changes to the Expressway alignment to accommodate the natural channel design and to reduce long term environmental impacts.

Further refinements will be made during detail design to the design shown on Map 1. For example, the creek realignment will be further defined and stormwater ponds may change in size or location. However, the overall location of the road will not change with the following exception. Map 1 shows an area from the Mud Street/Mount Albion intersection to an area north of the Greenhill Interchange. The preliminary design in this area needs to be re-examined as a result of the visual assessment. The design objectives in this area are to:

- Reduce visual impacts from key vantage points,
- Provide a pedestrian crossing to address impacts to the Bruce Trail,
- Provide a wildlife crossing,
- Maintain the integrity of the landscape on and below the escarpment face; and,
- Address major utility requirements (hydro towers and gas pipelines relocation)

## MTO Responsibility (QEW/Expressway Interchange, QEW, Burlington Street Interchange)

The MTO will pay for the QEW/Expressway interchange as well as improvements to the QEW/Burlington Street interchange and the QEW between both interchanges. This is required to ensure the continued safe operation of this provincial road to the year 2020.

Draft Summary Report Volume 1 identified a number of design options that would be considered for the Burlington Street interchange and the QEW (Figure 2.2).

After meeting with area residents, (Lakeland Community Centre - January 19, 1998), MTO agreed to investigate other possible options that would minimize community impacts.

The results of MTO's investigations are as follows:

- After detailed assessment, MTO found Options A and B would provide inadequate afternoon peak hour traffic capacity in the eastbound direction and should not be considered further.
- Option C provides adequate afternoon peak hour capacity in the eastbound direction because of its core/collector lane design which allows traffic to safely and efficiently weave on and off the QEW between Burlington Street and Highway 20.

Option C has since been modified to further reduce impacts on the Red Hill Marsh and Van Wagner's Ponds.

## 2.3 Red Hill Creek Natural Channel Realignment

Red Hill Creek flows from Mount Albion Falls and meanders back and forth through the King's Forest Golf Course and across the valley floor north of the CPR (TH&B) railway embankment to Windermere Basin.

As indicated in the Red Hill Creek - State of the Watershed Report, development on the Mountain has resulted in high volumes of water flowing through Red Hill Creek from storms. This, coupled with hardening (concrete) of the Creek banks, has caused the Creek to become abnormally unstable in the area between the TH&B rail line and Barton Street. Creek banks are eroding at a higher rate and to a greater extent than occurs naturally. The creek bottom is also cutting deeper, in some places down to bedrock. If left alone to stabilize over a long period of time (50 to 100 years) the creek would widen to 3 - 7 times its present width which is 10 metres on average. Vegetation that presently borders Red Hill Creek would be lost.

Steps to correct the instability will utilize "natural channel design" principles. The creek will be relocated both vertically and horizontally along a new 5 kilometre alignment west of the Expressway, from Kings Forest Golf Course to north of Barton Street. Relocating to the west of the Expressway will reduce the number of creek

crossings of the Expressway and the associated hardening of the creek. Raising the creek will allow the creek to flood its banks more frequently but with less intensity. This approach also reduces the number of times the Expressway crosses Red Hill Creek from 14 to 8.

The Federal Department of Fisheries and Oceans, who will be reviewing this work for an authorization permit, supports the Region's use of a natural channel design approach. Map 1 shows the general area where the stream will be located. Its final alignment, including floodplain area, will be refined during detail design.

A report detailing the natural channel design approach will be drafted when the final design is determined (Summer/Fall, 1998).

## 2.4 Stormwater Management

Management of stormwater quantity is integral to the establishment of a stable creek system and the operation of an Expressway within the flood plain. As well, it is important to address quality of stormwater considering that this was identified as an important issue in the Watershed Plan and in the Remedial Action Plan goals for Hamilton Harbour. Also, the Ministry of Environmental requires that water quality be addressed as per Provincial objectives.

Areas that will detain stormwater for short periods of time (a few hours) are located south of the TH&B embankment on the main Red Hill Creek and upstream of the S-E/W ramp at King St. on the Davis Creek tributary (see **Map 1**). In these areas water is detained (ponded) during large and intense rainfalls that occur once every 5-100 years.

The purpose of these stormwater detention areas is to:

- Supplement the stormwater detention areas located at the Dartnall Road Interchange;
- Protect the QEW and Expressway from the major flood events;
- Reduce the intensity of flooding and erosion in the Creek as a result of large storms; and,
- Ensure that culverts and bridges are designed in an efficient and cost effective way

By detaining the water, the peak or maximum runoff in the stream during a rainfall event is reduced; hence the ultimate flood elevations or levels are reduced and the size of the downstream openings (i.e., bridges and culverts) can be kept small.

Stormwater quality ponds proposed at various locations adjacent to the Expressway appear as small ponds or pockets of wetland (see **Maps 1, 2 and 3**). These created wetlands receive runoff from the Expressway drainage system and in some areas from adjacent urban storm sewer systems. The storm runoff is directed to ponds designed to settle sediment before water is discharged to the creek.

A report detailing the stormwater quantity and quality measures that are being undertaken in conjunction with the Expressway accompanies DSR Vol. 2

## 2.5 Red Hill Combined Sewer Overflow (CSO) Pipe

In 1988, the Regional Municipality of Hamilton-Wentworth and the Ontario Ministry of Environment and Energy initiated a Pollution Prevention Plan with strategies that would reduce pollutant loads from combined sewers to Hamilton Harbour, Cootes Paradise, Red Hill Creek and Chedoke Creek. Combined sewer overflows (containing sewage and stormwater flows) in the valley outfall directly into the Red Hill Creek.

Since its completion, the Region has been actively reducing combined sewer overflows through the construction of Combined Sewer Overflow storage facilities. Their purpose is to capture and assist in the treatment of Combined Sewer Overflows before it is discharged into receiving waters.

The Regional Municipality of Hamilton-Wentworth Pollution Prevention Plan identified four major sources of Combined Sewer Overflows to the Red Hill Creek:

- Melvin;
- Queenston;
- Lawrence; and
- Greenhill.

Of these four sources, Greenhill is the only location where a Combined Sewer Overflow storage facility currently exists. As no Combined Sewer Overflows control

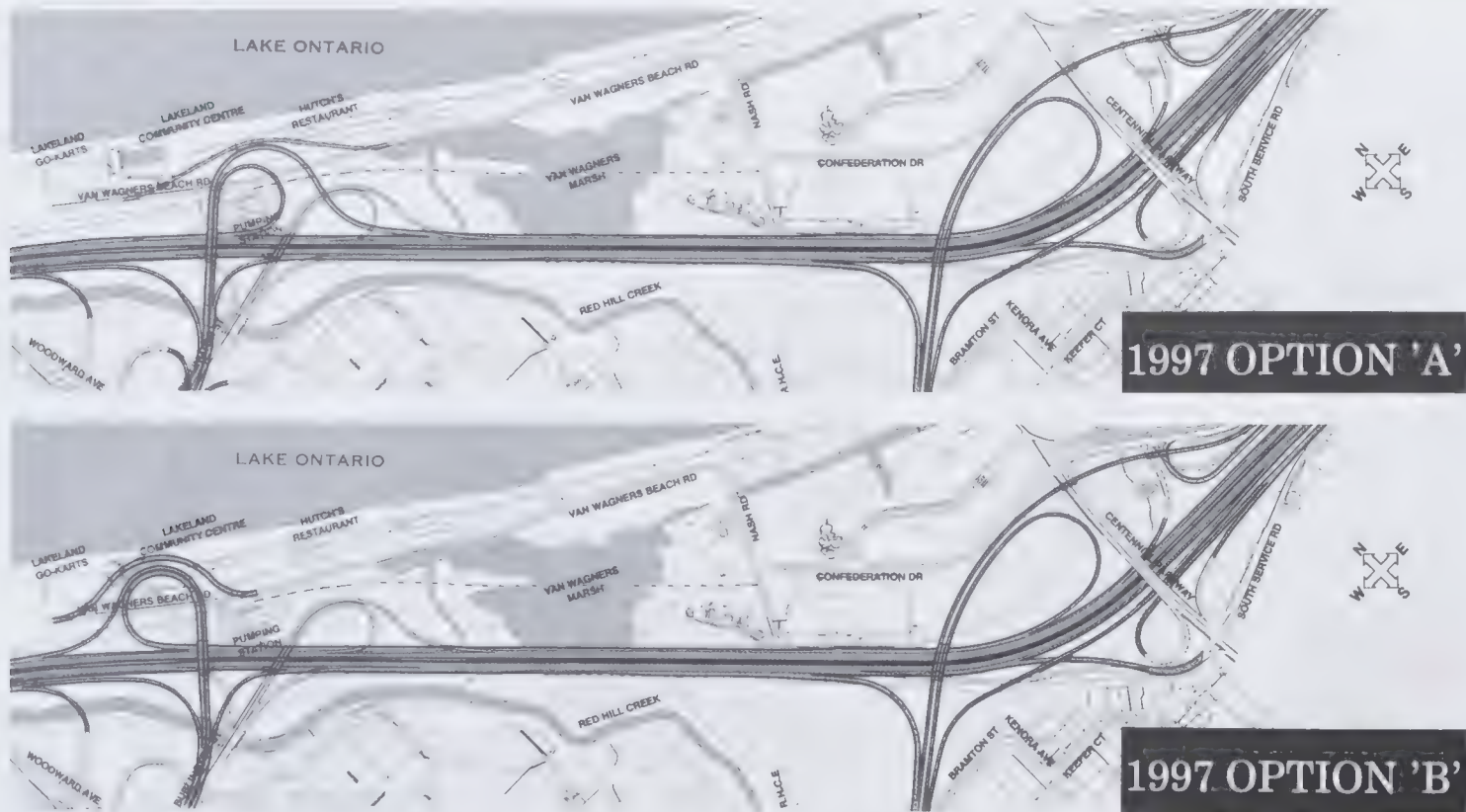
## (2.3) Red Hill Creek Natural Channel Realignment

## 2.4 Stormwater Management

## 2.5 Red Hill Combined Sewer Overflow (CSO) Pipe



Figure 2.2: QEW / Burlington Street Options





## (2.5) Red Hill Combined Sewer Overflow (CSO) Pipe

## 2.6 Project Construction

## 2.7 Project Cost

currently exists at the Melvin, Queenston and Lawrence sites the Region undertook a Class Environmental Assessment to determine an appropriate way to manage this type of water pollution.

The preferred plan to reduce Combined Sewer Overflows to the Red Hill Creek involves placing a pipe approximately 2.5 metres in diameter under the Expressway. The pipe will begin at the existing Lawrence Road outfall and extend north to the CNR embankment. The facility would be constructed with the Expressway construction and would fall entirely within the proposed road and creek corridor. The facility will be constructed using open-cut techniques and will be at depths similar to the existing Red Hill Creek interceptor sewer, adjusted where necessary to meet minimum cover requirements and to pass safely under the Red Hill Creek.

The elevation of the pipe at the south end (by Lawrence Avenue) will be below the existing interceptor to provide the opportunity of diverting sewage flows to the new facility in the event the existing interceptor is in need of repair. The elevation at the north end will be high enough to allow drainage back into the existing interceptor.

When built, the pipe will reduce the number of storm and sewer discharges to Red Hill Creek from 20 - 27 to 1.4 times per year.

## 2.6 Project Construction

The Project construction will be tendered for two types of work.

1. Highway and CSO pipe related work (including erosion control and bank stabilization where the creek is associated with the road)
2. Restoration related work (including pre-clearing, clearing, stream realignment, plant salvage, landscaping, habitat restoration)

The stream realignment and its associated vegetation restoration, landscaping of the highway corridor, reforestation and habitat restoration outside of the corridor will be tendered separately from the highway construction. This is important in order to ensure that skilled contractors carry out these specialized activities. These works will require specialized on-site supervision as well.

In addition, there may be a partial or area specific pre-clearing contracts to allow access for specific geotechnical investigation and project layout, as well as, the pre-construction harvesting of seedbank material and the transplantation of unique plant species.

Construction of the North-South section of the Red Hill Creek Expressway is expected to be tendered in six major highway contracts beginning in the fall of 1998.

The first contract will involve the extension of the 'Line' from Dartnall Road to Mud Street in the fall of 1998. This section of roadway is expected to be open to traffic in the fall of 1999.

The other five major contracts described below will be issued beginning in the summer of 1999.

1. The Expressway grading, granular, asphalt and drainage from Pritchard Road to Glencastle Drive, including the Escarpment crossing and bridge structure and completion of the Mud Street Interchange
2. The Expressway grading, granular, drainage works from Glencastle Drive to north of Queenston Road, including the Greenhill Avenue, King Street and Queenston Road Interchanges, the Lawrence/Mount Albion Roads bridge, bridges/culverts and associated creek work.
3. The Expressway grading, granular and drainage works from north of Queenston Road to Brampton Street, including the Barton Street Interchange, CNR Grade Separation and associated creek relocation and bridge/culvert work.
4. The QEW/RICE and Burlington Street/QEW Interchange construction, including all structures, creek works, grading, granular and paving.
5. Paving of the Expressway from Brampton Street to Glencastle Drive, including signage, illumination and paint markings.

The Region has assumed, for impact prediction purposes, that construction activities (e.g., clearing, equipment storage, and stock piling) can be kept within approximately 5 metres of the Expressway cut and fill limits. Equipment access to the Expressway construction site will essentially be made at interchanges.

## 2.7 Project Cost

Costs associated with the Regional portion of the project (including mitigation strategies described in Chapter 3) is in the order of \$136 Million. This amount is still within the approved budget.



# Impact Assessment

## CHAPTER 2

This chapter outlines the positive and negative impacts that are predicted to occur as a result of project construction and operation. It also identifies the types of strategies that can reduce or compensate (mitigate) for the predicted impacts. **Maps 2 (Impact) and 3 (Mitigation)**, at the end of this report, illustrate many of the statements made in this chapter.

### 3.1

## Impact Prediction and Mitigation

The aim of this study is to identify the impacts that the Project described in Chapter 2 is predicted to have on the environment (i.e., natural and human settlement) before construction takes place. The description of the environment that will be affected by the Project is documented in Draft Summary Report Volume 1 (November 1997) and the State of the Red Hill Creek Watershed Report (October 1997).

When describing Project impacts one must consider the following:

### Timing

Project construction activities will begin in the fall of 1998 with the extension of the Lincoln M. Alexander Parkway from Dartnall Road to the Paramount Drive/Mud Street area, which will be open to traffic in 1999. The remainder of the project (Red Hill Valleys/QEW portion) will start in 1999, after remaining government approvals are satisfied, and end in year 2002.

The latter portion of the project will include pre-construction activities such as plant salvage, selective clearing, and creation of the new creek in areas separate from the existing creek; and construction staging related to the Expressway, stormwater management, and the Combined Sewer Overflow pipe. Plant salvage means saving plants that would otherwise be removed during construction and moving them to another location.

### Direct/Indirect Impact

The project described in Chapter 2 defines the limit of direct impact to the environment as a result of construction. This is the area where the existing environment is permanently changed as a result of road, stormwater management, and creek realignment construction.

For the area defined by the road, the permanent change includes the area that will be paved and up to 5 metres from the top or bottom of the side slopes. Although the side slopes will be vegetated, they will never sustain the vegetation or wildlife habitat that existed prior to construction. For the stormwater management areas and the stream realignment, the area is changed from one type of natural environment to another. Other examples of direct impacts include the loss of private property, potential loss of recreational playing fields, and the change to noise and air quality levels.

Indirect impacts differ in that they may not be the direct result of clearing or construction but occur as a result of roadway activity. For example, noise and dust created by the operation of the road may discourage wildlife from using remaining habitat in close proximity to the road. For the purposes of wildlife and vegetation impact, the Region has assumed indirect impacts will likely occur within a 50-metre setback distance from the driving surface of the road.

### Cumulative Impacts

The Red Hill Creek Watershed Action Plan (the Plan) provides an important context for assessing cumulative impacts. Specifically, the Plan describes the State of the Watershed (both natural and human settlement), the key issues facing the Watershed, such as water quality impairment, creek instability and wildlife habitat protection, and provides various options for addressing those issues.

As noted in Draft Summary Report Volume 1, the Project takes guidance from the Plan. For example, the Plan recognizes that development activity within the watershed has contributed to creek instability and water quality impairment. The Project responds to these issues by including measures that will serve to stabilize the creek and improve water quality. As mentioned, the Plan also recognizes the need to protect and enhance wildlife habitat which, given the nature of the Project, is difficult to fully achieve despite landscape and restoration efforts.

The impact assessment work documented in this report provides a clear understanding of the impacts the Project is predicted to cumulatively generate over various timeframes and geographic areas. It also places in context the significance of each impact as it relates to existing conditions.

### 3.1

## Impact Prediction and Mitigation

## 3.2 Results

## 3.2 Results

This section describes the impacts of the Project and proposed mitigation strategies. The following terms are important to understand when reviewing this material:

### Factors

Factors describe the various aspects of the environment that are likely to experience change as a result of the Project. Factors used in this study include:

- 1) Human Settlement
  - Air Quality (see page 12)
  - Noise (see page 14)
  - Cultural Heritage (see page 16)
  - Contaminated Sites (see page 18)
  - Visual Resources (see page 20)
  - Transportation (see page 22)
  - Existing and Future Land Use and Infrastructure (see page 24)
- 2) Natural Environment
  - Fisheries (see page 28)
  - Groundwater (see page 30)
  - Surface Water (see page 32)
  - Water Quality (see page 34)
  - Vegetation and Wildlife (see page 36)

### Indicators

Indicators describe how the factor will change when the Project is built. For example, the introduction of expressway traffic in Red Hill Valley will change the level of noise adjacent residents can expect to experience. The "factor" is noise and the "indicator" is change in sound level measured in decibels (dBs).

### Rationale

The rationale helps the reviewer understand why the particular indicator is important to measure. In some cases the indicator is needed to address a government regulatory requirement or to measure the impact the project will have on a particular feature that is important in the study area.

Note: the Community Stakeholder Committee reviewed and commented on factors, indicators and rationale presented in this section.

### Impact (Without Mitigation)

This relates to the environmental effect or consequence the project is predicted to produce without applying measures to reduce the effect. The project can have a positive or negative effect on the environment. For example, the introduction of expressway traffic in Red Hill Valley will increase the amount of noise adjacent residents experience by a certain amount (e.g., 50 dB to 65 dB). The impact without mitigation in this example would equal 15 dB. An increase in sound level of this magnitude is considered negative and would warrant mitigation consideration.

### Mitigation

When a negative environmental impact is predicted, measures can usually be taken to offset or reduce the magnitude of the impact. For example, noise walls (mitigation) can reduce the level of impact by as much as 5 to 10 dB.

### Net Impact

Net impacts are the impacts that remain after mitigation is applied. For example, if the noise impact was predicted to increase by 15 dB and a noise wall could reduce the impact by 5 dB, the net impact would be a 10-dB increase.

### Significance

Net impacts can vary in their degree of significance. For example, a 3-dB increase in sound level is considered insignificant because humans cannot detect changes that small in magnitude. A 10-dB increase, however, is perceived as a doubling of sound level, which is noticeable and is considered significant.

The following tables outline the impacts associated with each factor previously identified. In most instances a technical report is available to explain the methods used to reach impact assessment conclusions.





# Factor: Air Quality

## Human Settlement

### CHAPTER 3

#### Indicator:

- Estimated change in local air quality within the Red Hill Creek Valley as a result of Expressway construction and operation (air quality parameters investigated include carbon monoxide (CO), respirable dust (PM<sub>10</sub>), oxides of nitrogen (NO<sub>x</sub>), and total suspended particulate (TSP))
- Estimated change in regional air quality as a result of Expressway construction and operation
- Estimated change in microclimatic conditions (specifically the water budget and energy budget) within the valley

#### Rationale:

Expressway construction and the introduction of vehicle traffic within the valley will change existing air quality conditions. Future levels of CO, NO<sub>x</sub>, and PM<sub>10</sub> will be compared to Ministry of Environment (MOE) ambient air quality criteria (AAQC). AAQC reflect desirable pollutant concentrations specified under Regulation 337 of the Environmental Protection Act.

The impact to the local microclimate in the daytime will be due to the contribution of heat from vehicles and the road surface, which will be a function of vehicle fuel combustion, local traffic volume, and road surface area. Under night conditions and low traffic volume, the roadway surface will cool at a faster rate than the surrounding area and potentially lead to a greater penetration of frost into the forest. Other contributing factors include defoliation/deforestation activities related to expressway construction.

## Red Hill Creek Expressway (Mud Street to Brampton Street)

### Impact (without mitigation)

#### Impact on Local Air Quality

Carbon Monoxide (CO) - maximum predicted 1-hour CO concentrations are well below the MOE - AAQC of 30 parts per million (ppm) at all 150 receptor locations.

Nitrogen Dioxide (NO<sub>2</sub>) - maximum predicted 1-hour NO<sub>2</sub> concentrations are well below the MOE - AAQC of 21 ppm at all 150 receptor locations.

Respirable Dust (Particulate Matter as PM<sub>10</sub>) - maximum predicted 24-hour PM<sub>10</sub> concentrations will exceed the MOE interim AAQC of 50 µg/m<sup>3</sup> at 127 out of

150 receptor locations at least 13% of the time. Locations likely to receive the highest levels include 600 metres north of Queenston Road on the west side of the Expressway and edge of the creek (predicted concentration = 249 ppm), and the Glencastle soccer fields (predicted concentration = 205 ppm).

When compared to actual PM<sub>10</sub> levels associated with Highway 404 whose evening rush-hour volume are 24% higher, Expressway predictions appear to be highly conservative (i.e., as much as 300% over

estimated).

Total Suspended Particulate (TSP) maximum predicted 24-hour TSP concentrations are predicted to exceed the MOE interim AAQC of 120 µg/m<sup>3</sup> at 125 out of 150 receptor locations at least 13% of the time. Locations likely to receive the highest levels include 600 metres north of Queenston Road on the west side of the Expressway and at edge of the creek (predicted concentration = 599 µg/m<sup>3</sup>), and the Glencastle soccer fields (predicted concentration = 491 ppm).

As mentioned previously, these estimates appear conservative (i.e., in this case as much as 400% over estimated).

In general, excesses of the MOE criteria for PM<sub>10</sub> and TSP occur within a 200 metre limit (east and west) of the Expressway.

Air quality impacts incurred during construction cannot be readily predicted. However, measures can be taken to minimize dust related emissions (see mitigation).

#### Impact on Regional Air Quality

Planned roadway improvements in the Region, which include the Expressway and the Highway 5 bypass around Watford, are predicted to reduce vehicular emissions of gaseous pollutants (i.e., not including PM<sub>10</sub> and TSP dust) generated during morning rush hour. This conclusion is based on a comparison of two future (i.e., year 2021) transportation scenarios, no changes to the current roadway system versus the planned roadway improvements previously mentioned. These results are from a recent transportation study con-

ducted as part of the Hamilton-Wentworth Air Quality Initiative (HAQI) programme. Emissions of Hydrocarbons (HC), Oxides of Nitrogen (NO<sub>x</sub>) and Carbon Monoxide (CO), with the road improvements in place, are predicted to decrease by 16%, 3% and 16%, respectively during morning rush hour periods in the year 2021. While the total number of kilometres travelled within the Region are predicted to increase, increases due to the roadway improvements (including the Expressway), the new road network will

reduce peak travel period congestion and produces a corresponding net decrease in pollutant emission levels.

It should be emphasized, however, that the above results are representative of peak traffic periods only, and that during off-peak hours, emission levels with the new roadways in place may be higher than for the existing base roads. However, the peak rush hour periods represent the worst-case scenario from an air quality impact perspective. The two rush hour traffic periods (0700-0900 and 1600-1800) account for

about 30% of daily traffic movements.

Please note that only automobile emissions were considered (i.e., trucks were not accounted for) and that regardless of planned roadway improvements, vehicle emissions in the year 2021 will be higher than current (modelled year 1991) emissions.

Reductions in single trip emissions for vehicles using the Expressway versus Centennial Parkway and using the Expressway versus QEW/Highway 403 are predicted, and result from increased free flow traffic speed and decreased travel distances.

#### Impact on Microclimate Conditions

The assessment of worst-case thermal impacts related to the construction and operation of the Expressway reveals insignificant temperature changes in the City of Hamilton and City of Stoney

Creek, and minor temperature changes in the Red Hill Valley (i.e., a 2.5 degree Celsius increase in summer daytime temperature that may be detected adjacent to the Expressway but lowers to a non-

detectable value at a distance of about 200 metres away. Similarly, a 2 degree Celsius decrease may be detected adjacent to the Expressway under clear nighttime conditions. The influence of this cooling was

likewise predicted to be detected at a distance about 200 metres away).

## Mitigation

Possible options for reducing particulate emissions from roadways include street cleaning methods such as wet roadway sweeping and flushing. Other measures include limiting soil erosion by planting vegetation, reducing surface loading of particulates, by paving the shoulders of the road, reducing the use of sand and salt in winter through improved snow plowing, and washing sand before using it. Wind screens or even re-locating the soccer fields in the Glencastle area should also be considered. As a condition of the original Environmental Assessment approval (1985), the Region will monitor air quality before, during and after Expressway construction. Future monitoring efforts should also be focused in

None required

At both a Regional and local level, consideration should be given to tree plantings and additional green space. Within the valley, the proposed creek realignment and stormwater management ponds will also help to stabilize ambient air temperatures

potentially high impact areas such as the Glencastle soccer field.

Dust emissions generated during construction will be minimized through watering of dust-earth surfaces, vegetating slopes as quickly as possible and washing equipment before allowing local street

## Net Impact

Concentrations in the valley will be higher after the road is constructed. Measures can be taken to reduce levels of particulates, small particulates are difficult to reduce.

A positive impact on Regional air quality is expected during rush hour period.

Some degree of reduction could be made to the slightly elevated temperature levels.

## Significance:

Regardless of the conservativeness of the predictions that emission levels may have substantially over-estimated, the Region will retain air quality health professionals to assess the implications of this information.

TSI and PM<sub>10</sub> are air quality issues that are a concern to Hamilton. A special study team (Hamilton Air Quality Initiative) has been examining ways to improve overall air quality. Regional Council has endorsed several projects that will be implemented in the next year that support the Hamilton Air Quality Initiative.

The free flow of traffic on the Expressway will help to improve current traffic flows on local streets such as Mount Albion Road, reducing local air pollution.

The overall increase in Valley temperature is not considered significant.

## Information Source:

RWDI, Air Quality Assessment North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, June 1998

RWDI, Vehicle Air Emissions Inventory North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, June 1998

RWDI, Thermal Dynamics Assessment North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, June 1998

## Factor: Noise

## Human Settlement

## CHAPTER 3

## Indicator:

magnitude of, sound exposure levels (mag-

use sensitive areas as a result of express-  
and operation.

Rationale:

Understanding the magnitude of these changes will help

### Red Hill Creek Expressway (Mud Street to Brampton Street)

## Impact (without mitigation)

### Change to Sound Exposure

areas (i.e., residences including townhouses and apartments with ground level outdoor living space, hospitals, and nursing homes for the aged, provided they have outdoor living space for patients).

interchange area).

### Mitigation

areas that are predicted to experience sound exposure increases of more than 5 dBA above current ambient levels. Mitigation could involve the installation of noise barriers, typically as high as 3 to 4 metres.

conduct a pre-blast survey of residential units in close proximity to the site. The survey should be conducted by a competent person, and the results used to give notice prior to blasting.

Construction specifications will require noise control on equipment (e.g., mufflers).

### Net Impact

to 11 dB in noise sensitive areas.

The MTO/MOE objective for outdoor sound levels is the higher of Leq (24 hours) 55 dBA or the existing ambient MTO/MOE level, whichever level is less than or equal to the predicted level of acoustically transmitted sound from the facility.

Concentration decreases over time at all locations, and at least a 50% reduction is typically achieved within three years (at varying locations and times, depending on staging of construction).



QEW (from Centennial Parkway to Burlington Street)

Impact (without mitigation)

Mitigation

Net Impact

Existing sound exposure levels at receptors near the QEW are high for noise sensitive areas in an urban environment and range from 69 to 72 dBA. Change in sound levels as a result of the QEW/Expressway interchange and modifications to Burlington Street Interchange are not expected to exceed 2 dBA.

During detailed design, the feasibility of sound barrier installation along Road North of the QEW will be assessed.

Sound barrier installation along Road North of the QEW will result in a reduction of sound exposure levels of 2 to 3 dBA.

Significance:

Based on general practice, people perceive increases in sound exposure the following way:

- 3 dBA is considered imperceptible
- 4 to 5 dBA is considered just noticeable
- 7 dBA is considered marginally significant, and
- 10 dBA or more is considered significant on an increasing basis and is perceived as a doubling of sound exposure per 10 dBA increase.

Information Source:

RWDI, Traffic Noise Impact Assessment North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, (revised draft) June 1998

MTO, Highway Noise Impact Assessment W.P. 441-97-00 RHCE/Queen Elizabeth Way Intersection in Burlington, for the Region of Hamilton-Wentworth, April 1998

# Factor: Cultural Heritage

## Human Settlement

### CHAPTER 3

#### Indicator:

1) Condition and integrity of archaeological sites removed during Expressway construction or disturbed through isolation and/or introduction of physical, visual, audible or atmospheric elements after expressway construction

2) Number, type, condition and integrity of built heritage sites removed during expressway construction or disturbed through isolation and/or introduction of physical, visual, audible or atmospheric elements after expressway construction

3) Number, type, condition and integrity of cultural landscapes removed during expressway construction or disturbed through isolation and/or introduction of physical, visual, audible or atmospheric elements after expressway construction

#### Rationale:

The Expressway will impact archaeological sites, built heritage sites and cultural landscapes within the study area. Understanding the impact to these features will help the Region fulfill conditions required under the original environmental assessment approval and in the development of mitigation.

### Red Hill Creek Expressway (Mud Street to Brampton Street)

#### Impact (without mitigation)

##### Impact to Archaeological Sites

A total of 15 archaeological sites have been identified within the land potentially impacted by the proposed Expressway alignment. In terms of the types of sites impacted and related integrity (i.e., evidence of past disturbance): 3 are isolated finds from an undetermined prehistoric period; 5 are farmsteads from the early to mid-late 19th century - all have been disturbed one severely; 2 are lithic scatters (flint artifacts of an undetermined period) - both have been disturbed; 5 are undetermined; 2 are camps, one from a Middle Archaic/Middle Woodland time period, the other is undetermined - both camps have been disturbed; 1 is an Euro-Canadian community - there has been extensive past disturbance. This does not include works in the Kines Forest Park Site which may be affected by the creek realignment. When confirmed in detail design, appropriate investigations will be undertaken in that area.

##### Impact to Built Heritage Sites

The Expressway will impact a total of 10 built heritage sites: 4 are culverts, 3 of these are in reasonable to good condition - 1 has been modified recently and all but one is currently maintained; 2 are former house sites; 1 bridge abutment, in poor condition, integrity has been compromised by continued degradation, erosion and weathering; 1 bridge in fair to poor condition with minor modifications; 1 cemetery, well maintained and well preserved; 1 burial plot, well maintained and well preserved.

##### Impact to Cultural Landscapes

The Expressway will impact a total of 9 cultural landscapes. 1 remnant track is in poor condition and is compromised; 5 roadways (Melvin Avenue, former alignment of Hixon Road, Mount Albion Road, Upper Mount Albion Road, and Mud Street), condition ranges from poor to well maintained, integrity also ranges from compromised to well preserved; 1 rail right of way (Hamilton, Grimsby and Beamsville Railway), poor condition and considerably altered; 1 remnant orchard, trees are very mature, grid planting is discernible but is still compromised due to loss of fruit trees - 1 farm complex is well maintained and well preserved.

#### Mitigation

All archaeological excavation documentation and salvage is carried out as per Provincial standards and protocols. In addition to the work described here, the Region must fulfill its conditions of approval (1985 Joint Hearing Board). The 3 isolated finds require no further work, 3 of the 5 farmsteads require no further work, the remaining 2 require detailed site investigations (plowing) and possible excavation, the 2 lithic scatter sites require plowing for controlled surface collection and possible further excavation; 2 of the 5 undetermined sites require no further work, 3 require investigations to determine site character and extent; 1 of the 2 camps requires intensive testing and the other comprehensive salvage excavation, the 1 Euro-Canadian community site requires no further work.

2 of the 4 culverts should be retained during construction and the others require no further mitigation (adequate documentation is available). 1 house site should be subject to preliminary archaeological investigation if disrupted, and the other should have remaining landscape features protected; the 1 bridge abutment should be retained and stabilized as an industrial monument, the 1 bridge was recorded in 1989, the existing abutment should be retained and re-installed on-site, the 1 cemetery should be landscaped; the 1 burial plot should be protected from the Expressway by some visual buffer.

The 1 remnant track and the 5 roadways do not require mitigation because adequate documentation now exists, however, every effort should be made to retain the portions of the road that are not directly displaced, the abutment remnants associated with the Hamilton, Grimsby and Beamsville rail right-of-way should be retained and stabilized as an industrial monument; the remnant orchard requires no mitigation because adequate documentation now exists, however, every effort should be made to retain the portions of the orchard that are not directly displaced, the farm complex should be visually buffered from the Expressway by appropriate landscaping.

#### Net Impact

Where excavation and salvage is required, a resource is removed but information is recovered that helps us better understand the past.

The cumulative net impact of Expressway development will be generally benign. The continued attrition of affected remnant built heritage features will slow within a more stable, managed environment of Expressway development.

The cumulative net impact of Expressway development on the cultural landscape units will be generally adverse as a result of the inevitable transformation of the landscape into a new transportation corridor.

## QEW (from Centennial Parkway to Burlington Street)

### Impact (without mitigation)

#### Impact to Archaeological Sites

A total of 3 archaeological sites have been identified within the QEW study area: 2 are camps from the Middle Woodland/Transitional Woodland period - both have been disturbed; 1 is a camp from an undetermined prehistoric period - there is evidence of past disturbance.

### Mitigation

A total of 3 archaeological sites have been identified within the QEW study area: the 2 camps from the Middle Woodland/Transitional Woodland period require salvage excavation; the 1 camp from an undetermined prehistoric period requires investigation to determine site character and extent.

### Net Impact

Salvage excavation and salvage required, a resource is removed but information is recovered that helps us better understand the past.

#### Impact to Built Heritage Sites

Changes to the QEW may encroach upon 1 built heritage feature: the pumphouse in the Burlington Street interchange area, is in good condition and has good integrity.

The Pumphouse in the Burlington Street interchange area could be complemented by appropriate landscaping and demolition treatment of the embankment and/or retaining wall in this area.

The small number of built heritage features represents more recent human historical activity and greater integrity is maintained in the affected feature. Attrition of the affected built heritage feature by disruption of its setting and the net impact, although adverse, is considered minimal.

#### Impact to Cultural Landscapes

1 Remnant embankment, (Canadian National - Abandoned Beach Line), culvert and earth works are left, setting has been considerably altered; 1 Remnant track (Red Hill Creek Valley Road), abandoned and in poor condition, maintains little integrity; 1 Roadway (Van Wagner's Beach Road) in good condition, altered; 1 abandoned Rail Line (Canadian National) in good condition, altered.

The Remnant Embankment (Canadian National - Abandoned Beach Line) does not require mitigation because adequate documentation now exists and other portions of rail line will be retained. The Remnant Track (Red Hill Creek Valley Road) should be subject to protection through the erection of appropriate fencing and subject to preliminary archaeological testing; 1 Roadway (Van Wagner's Beach Road) will be mitigated by minor and sensitive realignment of the right-of-way; 1 abandoned Rail Line (Canadian National) does not require mitigation because adequate documentation now exists and other portions of rail line will be retained.

The fewer number of cultural landscape units represent more recent human historical activity and greater overall integrity of the units is maintained. Net adverse impacts are considered minimal.

## Significance:

In terms of archaeological resources, all of the sites, documented to date, have been compromised to some extent by past human intervention. A number of these sites, nevertheless, contain information that will contribute significantly to our understanding of the Region's past. Those sites will be subjected to detailed investigations prior to any further disturbance.

In terms of built heritage features, see net impact statement.

In terms of cultural landscapes, see net impact statement.

## Information Source:

Archaeological Services Inc., Utermann McPhail Cuming Associates, The Red Hill Creek Expressway (North-South Section) Impact Assessment: Summary Report of the Cultural Heritage Resource Assessment, Prepared for the Region of Hamilton-Wentworth, February 1998.

# Factor: Contaminated Sites

## CHAPTER 3

### Human Settlement

#### Indicator:

Number and type of potentially contaminated sites removed or disturbed during Expressway construction.

#### Rationale:

Identify potential and known contaminated sites along the Expressway corridor. Privately owned sites with suspected contamination will require further investigation once property owner allows the Region permission to enter or the Region acquires the property through agreement or expropriation. Establishing the type and extent of contamination prior to construction will be required to identify the management effort required to mitigate impacts and satisfy provincial requirements.

### Red Hill Creek Expressway (Mud Street to Brampton Street)

#### Impact (without mitigation)

##### Impact to Known Contaminated Sites

Details of this site are as follows:  
The area impacted during expressway construction equals approximately 8800 m<sup>2</sup>. Most of the waste is non-hazardous but some hazardous waste has been identified.

#### Mitigation

The area impacted during expressway construction equals approximately 8800 m<sup>2</sup>. This includes approximately 1000 m<sup>3</sup> of hazardous waste, 100,000 m<sup>3</sup> of non-hazardous waste and 23,000 m<sup>3</sup> of clean fill.

Leachate will be collected and runoff controlled during and after construction in the landfill. Appropriate construction methods will be used to prevent leachate from entering the landfill. All waste or contaminated soil or water transported from the site will be done so by a Ministry of the Environment approved waste carrier and in accordance with applicable environmental and transportation of dangerous goods legislation.

A site health and safety plan for all on-site workers and the public will be developed during detail design and implemented during construction.

#### Net Impact

The proposed construction of the Expressway will result in a net improvement over the existing condition. (i.e., reduces the amount of leachate leaving the landfill in an uncontrolled manner.)

##### Impact to Potentially Contaminated Sites

The Expressway will impact 4 potentially contaminated sites. Details of these sites are as follows:

**Site 1** (scrapyard on Nash Road - southwest corner of QEW)

Area impacted is approximately 3100 m<sup>2</sup>.  
Potential contaminants are metals, petroleum hydrocarbons, and PCBs.

**Site 2** (scrapyard on Nash Road - southeast corner of QEW)

Area impacted is approximately 6300 m<sup>2</sup>.  
Potential contaminants are metals and petroleum hydrocarbons.

**Site 3** (former waste disposal site)

Area impacted is approximately 4200 m<sup>2</sup>.  
Suspected waste is automobile parts.

**Site 4** (five crossings of an abandoned railway line)

Potential contaminants include pesticides, metals and wood treatment chemicals.

The Region will investigate prior to construction the extent of site contamination and manage material according to Ministry of Environment guidelines.

The investigation and clean up of contaminated sites is considered a net improvement over the existing condition.



## QEW (from Centennial Parkway to Burlington Street)

Impact (without mitigation)	Mitigation	Net Impact
<u>Impact to Known Contaminated Sites</u> Known sites are impacted.	Not applicable.	Not applicable.
<u>Impact to Potentially Contaminated Sites</u> Sites where mitigation is proposed outside the road construction area and where earth moving is required could potentially be contaminated.	A site investigation will be carried out at all sites where earth moving is required and that are outside the road construction area.	To be determined

## Significance:

Contamination is present in the area north of Barton Road. Mitigation strategies outlined here will better manage the pollution that is present, while protecting the health of workers and the general public, and avoiding lengthy and costly construction delays.

## Information Source:

Dillon Consulting Inc., Phases 1 and 2 Environmental Site Assessment North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, (Draft) May 1998

# Factor: Visual Resources-Niagara Escarpment

## CHAPTER 3

### Human Settlement

#### Indicator:

Level of impact (low, medium and high) to Niagara Escarpment brow (top slope area) and face (steep slope area) as seen from existing trails, roadways, open spaces and residential/development sites after expressway construction

Level of impact (low, medium and high) to lower escarpment slope as seen from existing trails, roadways, open spaces and residential/development sites after expressway construction

Level of impact (low, medium and high) to tablelands (hills) as seen from existing trails, roadways, open spaces and residential/development sites after expressway construction

#### Rationale:

The Expressway crossing of the Niagara Escarpment will impact three distinct visual resource features (the escarpment brow and face, lower escarpment and tablelands) as seen from existing trails, roadways, open spaces and residential/development sites. The level of impact (low, moderate and high) to these features will take into consideration:

- degree of landform alteration
- amount of vegetation loss
- degree of man-made structure encroachment
- degree of alteration to the type of view
- alteration of special features
- amount of seasonal alteration
- degree of alteration to the quality of experience

Establishing the extent and magnitude of visual impact to the Niagara Escarpment will help guide mitigation efforts

### Red Hill Creek Expressway (Niagara Escarpment)

#### Impact (without mitigation)

##### Impact to Escarpment Brow and Face

**HIGH** - From rolling foreground landscapes within the Red Creek Valley and from trail routes looking up from successional landscapes to the promontory (with in 0.5 km), increased visual exposure of hydro towers; the creation of a wide cut in the rock is out of character with the existing landform and geological patterns

**MODERATE** - From terrace areas of the King's Forest Golf Course Clubhouse and 1st Tee, also some sections of the Mountain Brow Road and the Bruce Trail (upper section)

**HIGH/MODERATE** - From lower terrace landscapes the viaduct/bridge will have some exposed dominating views experienced by trail users, the Expressway creates a high visual barrier looking east-west by bisecting the valley and separating land use and points of interest

**LOW** - Middle to background views to Escarpment cut from Glencairn park and sports field

##### Impact to Lower Escarpment Slopes

**HIGH** - The greatest level of exposure and direct viewing will be where the Expressway crosses Mount Albion Road and from King's Forest Ski Hill (closed)

**MODERATE/HIGH** - From intermittent panoramic views of the Expressway as experienced by Bruce Trail users throughout the Escarpment and valley area

**MODERATE** - Apartment dwellers will experience middle to background views (1.6-3.2 km), with the upper floors experiencing panoramic views of the Expressway and escarpment cut

##### Impact to Tablelands

**MODERATE/HIGH** - The creation of open long views along the Expressway right of way and to the Escarpment rock cut result in a major change to adjacent residential properties and existing trailhead

**HIGH** - Possible noise barriers located at back lots create high impacts to residential views of existing landscapes and valley

**HIGH** - Successional landscapes to the east of the proposed alignment will be highly degraded visually with an "engineered" highway side slope inserted into the pastoral rolling landscape

**HIGH** - Hydro towers become more visually prominent in the viewshed

#### Mitigation

Construct a viaduct/bridge that is "light" in appearance. Minimize the structural depth and column support as much as possible. Let the natural rolling topography and "knolls" remain under the bridge. Maintain a minimum bridge span of 170m in length to minimize disturbance to existing grade and vegetation

Avoid earth filling and introduce abutment walls to the base of the bridge. Avoid earth filling and the subsequent loss of escarpment face vegetation on the south end of the bridge. Use minimum cuts in the Escarpment rock face to maintain vegetation during construction. Retain existing stands of trees on the promontory slopes as close to bridge abutments as possible

Consider side slope flatter than 3:1. Maximize new native planting beside abutment walls to reduce the visual impact to the face. On the northern end of the viaduct/bridge, blend filling and grading to soften the grade integration into the rolling regenerating landscape. Plant on top of the escarpment plateau, although soil condition will limit high growth of dense species

On the northern end of the viaduct/bridge, and along the Expressway corridor, avoid 2:1 slopes. Blend grades into landscape. Protect plant communities where possible and use native tree and shrub planting that will gain height quickly. Create continuous planting corridors along the east and west side of the Expressway in locations that will not be adversely affected by highway spray and runoff. Plant the Mount Albion Road corridor to reduce the effect of creating an open corridor looking up the Escarpment. Planting will reduce visual impact of expressway as trail users use old road to climb the Escarpment

Where possible plant dense tree/shrub buffers adjacent to the road corridor in landscapes adjacent to the corridor. Enlarge existing tree stands where possible. Introduce native species that will gain height and density as quickly as possible. Grade side slopes flatter than 2:1 in the corridor and ensure that planting groups blend with existing landscapes. Use noise barriers that blend into the adjacent landscape

## Net Impact

The rock cut to create the Escarpment crossing creates a significant scar in the Escarpment brow that can not be mitigated by planting trees or shrubs as buffers. The proposed location of the Expressway in the crossing eliminates a scenic promontory and associated vegetation that can not be replaced on site or within the valley. The cut will be approx. 70m wide, with side slopes up to 12m high. The hydro tower at the top of the cut intensifies the height difference as it stands 45 m over the Escarpment edge.

The Expressway and possible bridge will be visually intrusive in the viewshed. Proposed tree/shrub buffers will be small when first installed and it will take a long time to fill in. In addition the survival of tree/shrub buffers will be constrained in the harsh environment created by the Expressway.

The cumulative effect of opening up views through the viewshed to not only the Expressway but to the hydro towers and increasing their visual intrusion is a significant impact that can not be mitigated.

The loss of existing regenerating landscapes in adjacent landscapes removes the possible future forest and vegetation buffers for the Expressway that were already initiated in the valley.

King's Forest provides the primary stand of trees that visually reduces the impact of the Expressway from the valley and more elevated landscapes at the valley periphery. The Expressway will also be highly visible in seasons where deciduous leaf cover does not afford screening. The impact of this change for trails in the area and residential homes is significant and can not be mitigated.

## Significance:

The Niagara Escarpment is an internationally recognized site. The proposed cut in the Escarpment changes its visual character and this should be considered significant. However, the NEC policy allows for new roads where need has been established.

## Information Source:

Hough Woodland Naylor Dance, Visual Impact Assessment North-South Section Red Hill Creek Expressway, for the Region of Hamilton-Wentworth, (Draft) June 1995

# Factor: Transportation

## CHAPTER 3

### Human Settlement

#### Indicator:

- adequacy of facility to safely accommodate projected traffic volumes
- operations - provide for adequate level of service for particular operation
- construction impact - traffic delays during construction

#### Rationale:

Construction of the Red Hill Creek Expressway in conjunction with changes to the existing QEW roadway must ensure the continued safe operation of the Regional road network and provincial roadway system.

Level of service measurements take into account such traffic parameters as weaving conditions on the QEW (directing motorists have to travel safely on and off the QEW between interchanges), ramp terminal conditions, ability to maintain posted speeds during peak periods, and driver's workload.

Temporary delays during construction must be minimized.

### Red Hill Creek Expressway (Mud Street to Brampton Street)

Impact (without mitigation)	Mitigation	Net Impact
<p><b>Impact to Traffic Volume</b></p> <p>The four-lane facility has been designed to accommodate projected 21 traffic volumes.</p>	<p>The number of through lanes has been reduced from 6 lanes to 4 lanes to accommodate projected volumes of traffic.</p>	<p>The four-lane Expressway will safely accommodate future travel demand.</p>
<p><b>Impact to Traffic Operations</b></p> <p>The Expressway can operate at the posted speed (90 km/hr) during peak hours in the west.</p> <p>Interchanges at Mud Street, Greenhill Avenue, King Street, Barton Road, and Barton Street will operate within an acceptable level of service.</p>	<p>The design of the Expressway has taken into consideration posted speeds. Redesign of the interchanges has considered the level of service.</p>	<p>The Expressway will operate safely.</p>
<p><b>Impact to Traffic During Construction</b></p> <p>Because it is a new facility, there will be minimal disruption to current traffic operations. Disruption could occur at new and redesigned interchanges such as Barton Street, CNR crossing and Burlington Street Interchange, and at Mount Albion Road and Mud Street.</p> <p>School buses may be re-routed or need to be provided safe passage through construction sites where detours are not possible. School children who walk across areas that will be under construction will have to be temporarily bused.</p> <p>Emergency services will be re-routed.</p>	<p>Signing and detours as per standard practice will be used to notify the public of traffic delays or detours.</p> <p>School boards will be provided with advanced notice of traffic detour.</p> <p>Emergency services will be provided with advance notice of traffic delays.</p>	<p>There will be inconvenience to the local travelling public and school boards during construction. Emergency services will have the ability to provide acceptable alternate routes.</p>



## QEW (from Centennial Parkway to Burlington Street)

## Impact (without mitigation)

## Mitigation

## Net Impact

The 8 through lanes of the QEW will accommodate an hourly total volume of up to 8,000-9,000 veh/hr per direction. There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, and peak recreational traffic demand.

The interchanges and collector lanes have been designed to accommodate projected hourly volume.

Minor inconvenience and delays may occur during construction.

The QEW core lanes can operate at the posted speed during peak periods in the year 2021.

The Burlington Street/QEW Interchange S-W ramp currently operates poorly because of the tight radius of the ramp. This will be improved to meet current standard; therefore, operations are expected to be acceptable. The new RHCE/QEW Interchange ramps will provide a high standard of operational quality and safety.

With the Burlington Street interchange improvements, the inconvenience and delays will be minimized.

The interchanges at Burlington St., RHCE, and Highway 20 will operate adequately.

6-Lanes will remain open on the QEW during construction, except for night lane closures. Some delays may occur when lane widths are reduced during construction. Generally, all moves at the existing interchanges will be maintained throughout the construction period except for possible short-term ramp closures at the Burlington Street Interchange. Construction likely will begin in 1999 and be completed by 2001.

Standard approaches to traffic at construction sites will be used. Advance warning of any lane closure will be provided to reduce impacts. Advance notification of construction activity will also be provided for the travelling public.

Inconvenience and delays may occur during construction.

## Significance:

Construction of the Red Hill Creek Expressway, together with changes to the QEW in the Burlington Street to Highway 20 area, will allow the Region of Hamilton-Wentworth and the Ministry of Transportation to safely and efficiently accommodate the expected growth in travel demand to the year 2021. The safe and efficient movement of people and goods is a cornerstone to the Regional and Provincial economy.

## Information Source:

McCormick Rankin Corporation/Ministry of Transportation and Region of Hamilton-Wentworth

## CHAPTER 3

## Indicator:

Rationale:

way alignment will have an effect on land and infrastructure features located within the study area. Documenting the effect these changes will have on existing policies and built features will permit development of appropriate mitigation as well as land use options.

## Impact (without mitigation)

### Mitigation

Approximately 100 metres of the Bruce Trail will be displaced. Glencastle Park Expressway embankments and air quality predictions directly impact the 3 soccer fields located in this area. Rosedale Park - the final realignment of Red Hill Creek could result in the displacement of 1 to 3 baseball diamonds. Kings Forest Golf Course - creek realignment activities may result in 2 tees being displaced. The full extent of disruption will not be known until final design.

A 750-metre section of Trans Northern pipeline within the Expressway corridor must be relocated. The CN rail line north of Barton Street will need to be temporarily diverted during construction of the CN

2 properties will be displaced (i.e., businesses will have to relocate in order carry on existing activity) 1 property will be disrupted (i.e., requires the partial taking of property)

these areas (i.e., Red Hill Valley - ESA 52 and Hamilton Escarpment - ESA 47) will be impacted by the Project.

bridge. A spur line to the Sewage Treatment Plant will be redesigned. Ontario Hydro towers at the Escarpment may need to be relocated to address possible impacts to existing transmission lines in the Escarpment area.

**Bruce Trail** - the section of trail impacted by the Expressway will be realigned to connect under the proposed viaduct located near the foot of the Niagara Escarpment. A temporary route will be established to avoid the construction area.

The Region's Environmentally Significant Areas Impact Evaluation Group (ESAIEG) will be asked to advise staff on any changes that should be made to Environmentally Significant Areas (ESAs) designated in the Regional Official Plan.

Sewer and water lines must be located during detail design to determine how to avoid interference. Some lines may be upgraded as a result.

**Greenhill Avenue Interchange** will be designed to provide pedestrian/cyclist access to the valley. **Barton Avenue Interchange** will be designed to provide pedestrian/cyclist access.

**Kings Forest Golf Course** - mitigation will be developed when a creek realignment design is developed. All reasonable attempts will be made to minimize possible disruption to the golf course when selecting a final creek alignment.

**Glenside Park** - Discussions regarding the future suitability of this site for active recreational use will take place during detail design.

**Rosedale Park** - Opportunities to replace and possibly increase the number of ball diamonds in the immediate area will be examined when the final creek alignment is determined in detail design. All

ESAIEG will evaluate the Vegetation and Wildlife Habitat and Fishery Impacts/Mitigations to determine if there should be a re-assessment of the ESA Designation in the Official Plan.

## Mitigation (cont'd)

reasonable attempts will be made to minimize possible disruption to park activities when selecting a final creek alignment  
**Woodward Avenue Extension** - Lands that may have at one time been used to extend Woodward Avenue south of Melvin Avenue could be used for recreational purposes. A plan to develop this land for this purpose will be produced during detail design

All recreational proposals are subject to discussions with the community and City of Hamilton

**Open Space**  
Financial compensation for the lands permanently removed by the Expressway has been paid to the City of Hamilton

**Residential**  
A fair market settlement will be negotiated with each landowner

All utility work must be done to the standards of the utility owners

## Net Impact

**Recreation**  
**Red Hill Valley** - To be determined in discussion with ESAIG  
construction, however, there will be a net improvement in the trail connection between Lake Ontario and the Niagara escarpment  
**Brice Trail** - trail users will have to use the detour around the construction. The Trail connection across the escarpment will be designed in consultation with the Brice Trail Association. Greenhill Avenue Interchange - no loss in pedestrian/cyclist access to the valley  
**Barton Avenue Interchange** - will accommodate the safe access of pedestrians and cyclists to destinations east and west of the Expressway  
**Kings Forest Golf Course** - temporary disruption to 2 golf tees

To be determined in discussion with ESAIG

No loss of service. Some utilities may be upgraded as a result of the Expressway work

**Park** - to be determined in discussion with ESAIG  
to be determined in discussion with ESAIG  
**Woodward Avenue Extension** - once completed, overall recreational opportunities in this area will improve

**Open Space**  
Despite financial compensation, the loss of open space cannot be replaced in this area. The recreational experience in this area will be reduced

**Residential**  
Possible loss of property enjoyment  
Financial compensation will be provided

**Industrial Property**  
There is a net loss of industrial property that cannot be replaced in this area  
Financial compensation will be provided

## Significance:

The impacts to existing land uses in this area, should be regarded as significant even with mitigation. Both organized team sport fields users, trail users and other people that enjoy the valley will experience permanent changes in certain areas of the valley. These changes reduce the quality of the experience in some areas even though it may be possible to retain the level of service (e.g., the number of playing fields)

## Information Source:

Region of Hamilton-Wentworth and the City of Hamilton

# Factor: Existing/Future Land Use and

## CHAPTER 3

### Human Settlement

#### Indicator:

and/or length of existing recreational (trails, diamonds and formal trails), open space, residential, and industrial land uses permanently or partially removed as a result of Project construction. The land use planning policy of the Region of Hamilton's Official Plan (including areas designated "culturally sensitive") and City of Hamilton

as part of Project

#### Rationale:

Changes to the Expressway alignment will have an effect on land use and infrastructure features located within the Expressway study area. Documenting the effect that changes to the Expressway alignment will have on existing policies and built features will allow for the development of appropriate mitigation as well as

### QEW (from Centennial Parkway to Burlington Street)

#### Impact (without mitigation)

#### Mitigation

##### Impact to Existing Land Uses

###### Recreation

The trail south of QEW and east of Red Hill Creek will be disconnected where it crosses the Expressway. The informal Rail Trail at the Burlington St interchange will be reduced.

The proposed stormwater and fish wildlife habitat works might require the displacement of one baseball diamond.

Leaside Park - a ramp to design will disrupt an existing park

Confederation Park - modifications to the Burlington St /QEW interchange will impact

a 450 metre section of Van Wagner Beach Road. Other impacts to the Park's recreational functions are discussed under terrestrial impacts. No impact to existing parking lot

###### Open Space

No displacement or disruption

###### Residential

No displacement or disruption

###### Industrial

No displacement or disruption

###### Recreation

Trails - The Woodward Avenue/QEW underpass and Woodward Avenue will be improved for bicycling and pedestrian. Gilroy Park - The feasibility of using this site will not be known until soil contamination work is carried out during detail design

Leaside Park - a plan to minimize impacts will be developed during detail design

Confederation Park - the 450 metre section of Van Wagner's Beach Road will be

relocated approximately 10 metres in a northerly direction

All recreational proposals are subject to discussions with the community and City of Hamilton

##### Impact to Land Use Policy

The Regional Official Plan designates ESA

Van Wagner's Ponds and Red Hill

Confederation Park

ESAIEG will be asked to provide advice on possible changes to the Van Wagner's Ponds (ESA 50) Official Plan designation

##### Impact to Infrastructure

The pipes connecting the Region's Water Pumping Station to the water reservoir may need to be replaced during construction on their condition

The pipes will be assessed during preconstruction and any required work will be incorporated into detail design



## Net Impact

**Recreation**  
Widdward Avenue/QEW underpass - this will contribute to an overall net improvement to the trail system  
Globe Park - minimum impact since the ball diamond under consideration is under utilized.  
Leaside Park - to be determined in detail design. The objective is to find a suitable replacement in the community for the uses here.

Van Wagner's Beach - Road will continue to serve local traffic demands and parking will be unchanged.

To be determined through discussions with ESAIEC

No loss of service. Possible improvement to water pipes

## Significance:

Overall, modifications to the QEW in conjunction with proposed mitigation should result in a relatively minor impact on area land.

## Information Source:

Region of Hamilton-Wentworth and the City of Hamilton

# Factor: Fisheries

## Natural Environment

### CHAPTER 3

#### Indicator:

- Estimated change in the number of barriers to fish migration
- Estimated change in overall pool quality
- Estimated change in overall bank stability
- Estimated percentage change in in-stream cover
- Estimated change in the number of creek crossings
- Estimated change in the length of erosion protection

#### Rationale:

Changes to the present creek alignment are required to address creek stability problems and to accommodate expressway construction. This will result in a change to the overall length of Red Hill Creek. This information will assist in determining if there is a net loss or gain in habitat.

Wetlands provide spawning and nursery habitats for several fish species endemic to Hamilton Harbour and Lake Ontario.

Habitat requirements change with life stage and season. Migration of fish that inhabit lakes and streams to spawn are the most commonly known example of such movements. Barriers to migration prevent fish from accessing seasonally critical habitat and reduce or eliminate the opportunity for re-colonization.

In small southern Ontario streams, fish abundance increases as pool depth increases. Some larger species will only be present if deep pools are available. Deep pools can also provide shelter for adults of lake species which enter Red Hill Creek to spawn.

Although some erosion is a natural feature of virtually all streams, excessive erosion reduces bank cover and increases sediment loading downstream which can degrade fish habitat.

Cover (i.e., vegetation that overhangs a creek and provides shade, or boulders/rocks/logs that provide protection from predators as well as areas to rest when water current is high) is an important component of fish habitat, which generally increases fish abundance. This may be in part

► continued on page 40

### Red Hill Creek Expressway (Mud Street to Brampton Street)

Impact (without mitigation)	Mitigation	Net Impact
<b>Impact to Stream Length</b> Creek realignment is expected to lengthen the existing creek by 300 - 500 metres.	Creek realignment work already part of project	Net improvement in amount of fish habitat
<b>Impact to Wetland Habitat</b> None of the wetlands affected by this segment are fish habitat	Not applicable	Not applicable
<b>Impact to Fish Migration</b> Two barriers will be removed: 1) Queenston Road Channelization 2) Concrete Saddle south of King Street	Not required for a positive impact	Improved ability for fish to migrate upstream
<b>Impact to Overall Pool Quality</b> Creek re-alignment provides an opportunity to increase the overall quality of pools.	Not required for a positive impact. New pools will be designed as fish habitat.	There will be a net increase in the overall quality of pools
<b>Impact to Bank Stability</b> The creek realignment and creek bank restoration using vegetation provides an opportunity to mitigate the abnormally high rate of erosion that is occurring between the TH&B rail and Barton Street	Not required for a positive impact	Net improvements in bank stability and creek bank restoration
<b>Impact to In-Stream Cover</b> There will be an initial decrease during construction of the realignment and during the establishment of vegetation followed by a substantial increase in cover as vegetation matures.	Not required for a positive impact	There will be a substantial net increase in in-stream cover
<b>Impact to Creek Crossings</b> 8 new creek crossings will be added	New crossings (culverts, bridges) will be designed to contain fish habitat, and to accommodate fish passage	There will be a net increase of 8 crossings, however, impacts to fish passage will be minimized
<b>Impact to Erosion Protection</b> The creek realignment work will remove a minimum of 800 metres of concrete/hardened bank protection (gabions, concrete channels)	Not required for a positive impact	Net reduction in hardened bank protection and a net improvement to erosion protection through natural channel design

## QEW (from Centennial Parkway to Burlington Street)

## Impact (without mitigation) Mitigation

## Net Impact

No change in total length

Not required

No change in total length

Approximately 0.5 ha of wetland will be removed from Van Wagner's Pond

There are a number of opportunities to enhance existing fish habitat in the vicinity of Van Wagner's Pond. These options include: re-sculpting banks and floodplain downstream from Red Hill Marsh toward Windermere Basin, to create more wetland habitat which will provide spawning habitat for fish; and creation of more riparian zone along the lower reaches of Red Hill Creek by enlarging Van Wagner's marsh, planting native vegetation, and creating spawning marshes.

At a minimum there will be no reduction in total marsh area.

No additional barriers will be added to Van Wagner's Pond or Red Hill Creek

Not required

At a minimum there will be no additional barriers.

Not applicable in this area

Not applicable

Not applicable

Bank stability is not a problem in this area therefore no impact

Not applicable

No impact

Pier removal at Burlington Street

Not required

Pier removal at Burlington St should be considered an improvement in fish migration.

The reconstructed Burlington Street bridge piers will be removed from the Red Hill Creek

None required

No change in the amount of erosion protection

Not applicable

Not applicable

because it provides protection from predators such as birds or other fishes.

The existing number of creek crossings (i.e., TH&B, King St., Queenston Rd., etc.) will change as a result of the expressway. Bank protection already exists along sections of the Red Hill Creek (e.g., Kings Forest Golf Course, north of King St., etc.). This could increase as a result of expressway construction.

## Significance:

Creation of high quality fish habitat is implicit in the natural channel design approach. Fisheries concerns have been a driving force in its application here. In systems such as the Red Hill Creek, where conditions are degraded and continue to degrade, natural channel design will improve the quality of fish habitat over the long-term. The proposed approach increases the stability, reduces the bank erosion, increases pool quality, reduces the length of concrete and armoured channel, and eliminates three existing barriers to fish migration. Consequently, the natural design is seen as a positive alteration which will result in a net gain in fish productive capacity.

The protection of fish habitat is regulated through federal legislation, and an authorization from the Minister of Fisheries and Oceans is required before undertaking any activity which is harmful to fish habitat. Red Hill Creek provides habitat for several fish species, including some species which spawn in the creek but inhabit Hamilton Harbour and/or Lake Ontario at other times. Although most of these species are neither sport or commercial fishes, they are an important component of the Red Hill Creek ecosystem.

## Information Source:

C. Portt and Associates, Preliminary Design – Expressway and Creek Realignment

# Factor: Groundwater

CHAPTER 3

Natural Environment

Indicator:

is due to the presence of high levels of sodium chloride and magnesium in the groundwater.

Rationale:

For discharge systems, this discharge is primarily on the height of the local water table. Water discharge may be lessened by a reduction in the salt from a reduction in the local

Red Hill Creek Expressway (Mud Street to Brampton Street)		
Impact (without mitigation)	Mitigation	Net Impact
<p><u>Impact to Groundwater Discharge</u></p> <p>A 40% reduction in recharge may occur in the sensitive</p>	<p>Design storm water infiltration facilities (i.e., basin trenches) to maintain or enhance recharge.</p>	<p>Some enhancement is possible but overall there will be a net reduction in recharge. Overall, groundwater impacts are not considered significant.</p>
<p><u>Impact to Groundwater Quality</u></p> <p>Groundwater Quality Objectives (PW/QOs) where the water discharges.</p>	<p>Storm water infiltration facilities point to allow for subsurface attenuation of contaminants</p>	<p>However, potential increases in sodium and chloride (i.e., 50 - 100 ppm) are still expected.</p>



**QEW (from Centennial Parkway to Burlington Street)**

Impact (without mitigation)	Mitigation	Net Impact
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(See above)

Not Applicable

Not Applicable

(See above)

Not Applicable

Not Applicable

**Significance:**

Due to groundwater infiltration may affect vegetation that are sensitive to sodium chloride levels (see vegetation and wildlife) Overall, ground water impacts are not considered significant

**Information Source:**

Blackport and Associates, Hydrogeological Impact Assessment North-South Section Red Hill Creek Expressway for the Region of Hamilton-Wentworth, (Draft) November 1997

# Factor: Surface Water

## CHAPTER 3

### Natural Environment

#### Indicator:

rainfall crossings of the Red Hill Creek to flood during rainfall events (i.e., storms that occur on average 100 years - a.k.a. 100-year storm event, and rarer like Hurricane Hazel - a.k.a. Regional storm event).

#### Rationale:

Construction will change how surface water moves through Red Hill Valley during rainfall (storm) events.

Proposed stormwater management works, in conjunction with proposed roadway designs, have been developed to address the volume of surface water that will travel along the realigned Red Hill Creek (within and beyond its banks) during these events.

Measures to ensure the safe use of the Expressway, including road/rail crossings of the Red Hill Creek and valley recreational areas during storm events can be addressed by managing flood potential.

### Red Hill Creek Expressway (Mud Street to Brampton Street)

#### Impact (without mitigation)

##### Potential Roadway Flooding Impact

- In the event of a 100-year storm event, flood levels will decrease. This is primarily due to the larger culverts and bridge crossings proposed as part of the expressway construction as well as the storage of water in stormwater management facilities.
- The Expressway will be flood free up to 100-year storm (with potential minor violation of roadway related standards).
- The Expressway will be susceptible to flooding and damage under Regional storm event with flood depths in the order of 2-4 metres. The area likely effected extends from approximately the CNR line to TH&B rail line.
- Flood levels will be higher in areas where flood storage is proposed (i.e., Greenhill, Davis Creek, and the existing facility at Dartnall Road). Increases in flood level will range from 3 to 5 metres under the 100-year storm event and 2.25 to 2.5 metres under the Regional storm event. Typically, flood levels in these areas will remain this high for a period of 4 to 18 hours.
- Higher flood levels in the Davis Creek storage area may increase erosion activity.
- During the Regional storm event, damage to the Expressway may be significant.

#### Mitigation

Contingency plans will be prepared to ensure the safe movement of people and goods along the Expressway and other road/rail crossings of the Red Hill Valley up to the 100-year flood event. Contingency plans will be prepared to ensure the safe movement of people and goods during the Regional storm event.

Potential erosion increases in the Davis Creek will be confirmed in detail design. If required, a plan will be developed to address the potential impact.

#### Net Impact

Significant increase in flood level impact to residents.

## QEW (from Centennial Parkway to Burlington Street)

## Impact (without mitigation)

## Mitigation

## Net Impact

- The QEW will be flood free up to the 100-year event.
- QEW remains susceptible to flooding and damage under Regional storm event

Proposed stormwater management works have been designed to ensure the safe movement of people and goods along the QEW

## Significance:

In terms of the Expressway, providing flood protection to the 100-year storm event standard (through upstream flood control storage) is adequate with respect to public safety. Remaining potential for flood damage under Regional storm event would have low probability of occurrence. Potential for flood damage under Regional Storm conditions is common to many public roadways that cross or are located adjacent to watercourses.

In terms of the QEW, providing flood protection to the 50 to 100 year storm events would be a significant improvement over the existing condition that is flood prone during a 10-year storm event.

## Information Source:

Philips Planning and Engineering Ltd., Red Hill Creek Expressway (North-South Section) Impact Assessment and Design Process – Surface Water and Stormwater Quality Technical Report, (Draft) July 1998

# Factor: Water Quality

## CHAPTER 3

### Natural Environment

Indicator:

Construction parameters include:

- Demand (BOD)
- 
- 
- 
- 
- 

Rationale:

that in-stream water quality is not further degraded during operation, and where

Red Hill Creek Expressway (Mud Street to Brampton Street)		
Impact (without mitigation)	Mitigation	Net Impact
<p><b>Impact to Water Quality During Construction</b></p> <p>Wash-off of soil during construction of the expressway and creek realignment (assuming no protective measures were taken) would increase the total amount of sediment that is currently carried by the Red Hill Creek to Windermere Basin by up to 30-50% on an annual basis. This is based on the total suspended sediment originating in the Red Hill Creek including contributions from the Woodward Avenue Sewage Treatment plant.</p>	<p>Through the implementation of Erosion and Sediment control measures during construction and construction staging, predicted increases in suspended sediment should be less than 5 to 10%.</p>	<p>Given the fact that even the best erosion and sediment control measures are not 100% effective in preventing wash-off of soils from construction sites, the potential for negative impacts on stream water quality during construction cannot be entirely mitigated, particularly if uncharacteristically large rainfall events occur during the construction period.</p>
<p><b>Impact to Water Quality During Operation</b></p> <p>Proposed stormwater management measures, which include the proposed CSO storage pipe and stormwater ponds/wetlands to treat runoff from the Expressway and some existing development will reduce the current levels of suspended sediment, BOD5, Fecal Coliforms, PAH and phosphorus, zinc and copper that end up in Red Hill Creek.</p>	<p>Proposed stormwater management works have been designed to mitigate, to the extent feasible, the water quality impacts generated during Expressway operation.</p>	<p>See "Water Quality Impact" statements.</p>



### QEW (from Centennial Parkway to Burlington Street)

#### Impact (without mitigation)

#### Mitigation

#### Net Impact

##### Impact to Water Quality During Construction

Wash-off of soil during QEW construction would be less than the amount generated by Expressway construction. This conclusion is based on the relatively smaller area that would be disturbed during construction.

Through the implementation of Erosion and Sediment control measures during construction, predicted increases in suspended sediment will be relatively insignificant.

Given the fact that even the best erosion and sediment control measures are not 100% effective in preventing wash-off of soils from construction sites, the potential for negative impacts on stream water quality during construction cannot be entirely mitigated, particularly if uncharacteristically large rainfall events occur during the construction period.

##### Impact to Water Quality During Operation

In conjunction with works proposed in the Expressway area, proposed stormwater management measures will reduce current levels of suspended sediment, BOD<sub>5</sub>, Fecal Coliforms, PAH and phosphorus, zinc and copper that end up in Red Hill Creek.

Proposed stormwater management works have been designed to mitigate, to the extent feasible, the water quality impacts generated during operation.

Water Quality Impact\* statements

### Significance:

Increases in suspended sediment generated during construction should be placed in context with the existing condition. Current levels of suspended sediment transport in Red Hill Creek are approximately 4400 tonnes per year (i.e., 2100 tonnes generated from the watershed/creek plus 2300 tonnes from the Sewage Treatment Plant). During storm events, in-stream suspended sediment levels are currently comparable to runoff from a well-managed construction site which suggests that current in-stream water quality is poor. However, due to the temporary nature of the construction (2 to 3 years), impacts on sediment loading to the Red Hill Creek would be minor in the long term when creek stabilization objectives are achieved and annual suspended sediments are lowered.

The net reduction in long-term contaminant loading (post-construction) will have a positive impact on downstream receiving waterbodies. This is significant in that the Project would not increase pollutant inputs to the Hamilton Harbour and would for some parameters reduce pollutant loads coinciding with Hamilton Harbour Remedial Action Plan (RAP) objectives of reducing pollutant loads to the Harbour.

### Information Source:

Philips Planning and Engineering Ltd., Red Hill Creek Expressway (North-South Section) Impact Assessment and Design Process – Surface Water and Stormwater Quality Technical Report, (Draft) July 1998

# Factor: Vegetation and Wildlife Habitat

## CHAPTER 3

## Natural Environment

### Indicator:

number of habitat types, their area (hectares) and relative to be removed by project construction or potentially disturbed by road-related physical changes to the environment  
of habitats that support known significant species that will be removed by expressway construction or potentially disturbed by road-related physical changes to the environment

level of impact (low, medium or high) to ecosystem functions within the study area, based on degree of fragmentation and changes to key functions after expressway

**Habitat types** - upland forest, floodplain forest, successional wetland, shoreline, plantation

**Significant types** - Carolinian, escarpment, provincially significant wetland

Potentially disturbed - features may remain but may degrade, transform or disappear over time

**Physical changes to** - ground and surface water quality and quantity, microclimates, soils and slope topography, air quality, and noise

**Known significant species** - those with recognized status including certain plant, migratory and breeding bird, small mammal, amphibian, reptile, and butterfly species

**High Impact** - includes the removal or significant disturbance of existing natural areas resulting in the net loss of ecological functions that cannot be mitigated within the study area. In particular, these include the loss or disturbance of features representing:

- habitats of irreplaceable integrity that are critical to supporting living things that are considered significant
- habitats which play a critical functional role (such as habitat linkage) that will disappear or be permanently reduced

**Medium Impact** - includes partial removal or disturbance of existing natural area - however impacts can be partially or completely mitigated and will not affect existing functions over the long term

**Low Impact** - will not permanently change the existing quality or ecological function of natural areas

**Key function** - ground and surface water, erosion controls, habitat integrity reduced

## Red Hill Creek Expressway (Mud Street to Brampton Street)

### Impact (without mitigation)

#### Impact to Vegetation and Wildlife Habitat

##### Type and Amount Removed

Habitat types and estimated extent to be removed by project construction is as follows: (Note: Estimates are preliminary and subject to changes dependent upon design modifications)

- Open Space (Recreational Areas & Maintained Sites) - 7.7 ha
- Anthropogenic (Plantations & Cultural Wetlands) - 1 ha
- Natural Woodland/Forest (Upland/Lowland, Floodplain & Escarpment) - 36.7 ha
- Successional (Old Field, Thickets and other Regeneration Areas) - 28.3 ha
- Wetland (Marsh and Swamp) - 2.3 ha

The estimated number of trees removed (i.e., trees with trunk diameters greater than 5 centimeters) is approximately 40,000. Earlier estimates by community sources quote 47,000. Discrepancies between the two estimates are likely attributable to where sampling was conducted (i.e., dense immature forest and

plantation versus more open areas and mature forest). Nonetheless, both estimates are effective at highlighting the extent of tree loss in the valley.

##### Type and Amount Potentially Disrupted

A 50-metre setback distance from the limits of roadway grading was used to determine the habitat area potentially disturbed by Expressway construction and/or operation activities. In total, an area approximately 74 hectares in size may be negatively impacted by such things as dust, erosion, and sedimentation

generated during construction and salt spray, noise, and pollution generated during the operation of the roadway

Wildlife habitat potentially disturbed within this area includes forest and woodland, marsh, meadow, and riparian habitats. These habitat types are utilized by numerous species of wildlife including birds, mammal, amphibians, reptiles, butterflies and insects

#### Impact to Significant Species

Significant plant and wildlife species to potentially be removed or displaced by project construction and expressway operation include the following:

- Approximately 20% (or 18 hectares) will be removed by project construction (i.e., clearing, grubbing, creek realignment, stormwater management)
- An additional 27% (or 24 hectares) located within 50 metres of the project grading limits may be subjected to varying levels of indirect impacts (i.e., salt spray, noise, etc.)

##### Plants

A total of 35 significant plant species are known to occur in the impact area

- 9 species are considered rare in the Region of Hamilton-Wentworth
- 29 species are considered uncommon in the Region of Hamilton-Wentworth

##### Wildlife

Impacts to significant wildlife species include habitat displacement for

- 2 regionally rare butterfly species, the Northern Cloudwings and Hickory Hairstreak;
- 1 vulnerable bird species, the Cooper's Hawk;
- 1 regionally rare bird species, the Carolina Wren; and,
- 1 vulnerable mammal species, the Southern Flying Squirrel

#### Impact to Ecosystem Functions

High level impacts will occur throughout the entire Red Hill Creek valley system including the re-entrance section into the Niagara Escarpment. This is due to removal of habitats and significant biota (i.e. Carolinian floodplain forests, valley

slope forests, and wetlands); and loss of critical ecological functions such as primary and secondary linkage corridors (i.e., Red Hill Creek and Davis Creek valleys, and Niagara Escarpment)

Medium-level impacts will occur in less sensitive or more resilient habitats adjacent to areas cleared for project construction (i.e. recreational areas, immature forests and successional areas, etc.), and in habitats that will only be temporarily

affected by project construction

Low-level impacts are anticipated for areas located beyond the study area boundaries and in existing severely degraded habitats adjacent to project construction

## Mitigation

The Region has established a Landscape Restoration and Advisory Group (LRAG) to provide advice in the development of a plan to guide plant and wildlife habitat replacement. The Landscape Restoration Plan will adhere to the following methods of impact mitigation:

**Protection & Conservation** - measures will be taken to protect and conserve existing natural habitats from the disturbances of the Expressway and related works.

**Biodiversity Recycling** - Terrestrial resources and habitat elements (i.e., plants, soil seedbank, stumps, rocks, organic matter, etc.) will be salvaged for eventual re-use in the valley or other suitable areas.

Impacts to habitats known to support significant species will be mitigated using the following methods:

**Protection & Conservation** - measures will be taken to protect and conserve populations and habitats of significant plant and wildlife species.

**Biodiversity Recycling** - Significant native plant species populations will be conserved through transplantation of living plant material, salvaged soil seedbanks, and/or through seed collection and plant propagation.

High-level impacts cannot be mitigated due to the magnitude of their effects in the landscape and the lack of opportunities to replace similar ecological functions elsewhere in the Watershed.

Medium-level impacts can be partially or fully mitigated through the re-creation, restoration and enhancement of habitats and linkage corridors. Mitigation methods that

**Habitat Enhancement & Creation** - Existing degraded habitats will be enhanced and new habitats will be created and/or restored to replace those removed by expressway and related works.

**Habitat Management** - Certain specialized habitats (i.e., wetlands, Escarpment complex communities, Savannahs, etc.) will receive long-term management and monitoring to ensure their sustainability.

**Habitat Enhancement & Creation** - Habitats known to support significant species of plants and wildlife will be re-created and/or restored to replicate favorable habitat conditions for the eventual recruitment of these species.

**Habitat Management** - Certain specialized habitats (i.e., wetlands, meadows, Escarpment complex, Savannahs, etc.) will be subjected to long-term management and monitoring to ensure desirable conditions are created to sustain viable populations for significant plant species and habitats for significant wildlife species.

can be applied to offset impacts associated with project construction are highlighted in the above sections.

Low-level impacts can be fully mitigated through enhancement of existing degraded habitats. Mitigation methods that can be applied to offset impacts associated with project construction are highlighted in the above sections.

## Net Impact

Will be determined after the Landscape Restoration Plan is completed.

Will be determined after the Landscape Restoration Plan is completed.

High-level impacts will occur throughout the entire Red Hill Creek valley system including the re-entrant section into the Niagara Escarpment. This is due to removal of habitats and significant biota (i.e., Carolinian floodplain forests, valley slope forests, and wetlands); and loss of critical ecological functions such as primary and secondary linkage corridors (i.e., Red Hill Creek Valley, Niagara Escarpment and Davis Creek valley).

## Rationale:

The expressway and related works will eliminate existing habitats (i.e., their area and diversity), remove or displace many species reliant on these habitats, and fragment habitats that remain. Habitats, which are not directly removed, may be degraded or altered due to physical changes associated with construction or operation of the expressway. Significant species or habitats, which are those recognized as rare or particularly high quality on a regional or provincial basis, are indicators of environmental quality. The overall functions and integrity of the valley ecosystem will change during and following construction. Low to medium level impacts can be mitigated, but high level impacts will likely be permanent.

## Significance:

The Expressway will eliminate a significant portion of natural cover (forest, successional areas and wetlands) between Mud Street and the QEW. The loss of these features is considered substantial on a Watershed basis, and will reduce the functional value of the associated valley and Escarpment corridor. Alterations to flood frequency downstream of King Street will change the character of remnant habitats and regeneration processes in the lower valley.

Mitigation options are being considered which could potentially offset several key impacts, particularly the loss of terrestrial and wetland habitats. These will be subject to physical feasibility, stakeholder acceptance and budgetary commitments.

## Information Source:

Dougan and Associates, Red Hill Creek Expressway Terrestrial Resources Technical Report, (Draft) June 1998.

# Factor: Vegetation and Wildlife Habitat

## CHAPTER 3

## Natural Environment

### Indicator:

- **Vegetation** - their area (hectares) and relative project construction of 1 by road related physical changes to
- **Habitat** - of habitats that support known significant species will be removed by expressway construction or potentially by road related physical changes to the environment (low, medium or high) to ecosystem function in the study area, based on degree of fragmentation changes to key functions after expressway
- **Plant Types** - upland forest, floodplain forest, successional forest, plantation
- **Plant Communities** - Carolinian, escarpment, provincially
- **Wildlife** - **Disturbed** - features may remain but may be altered, transformed or disappear over time
- **Physical changes to** - ground and surface water quality and quantity, microclimates, soils and slope topography, air quality
- **Species** - **Interspecies** - those with recognized status including certain plant, migratory, and breeding bird, small mammal, amphibian, reptile, and butterfly species
- **High Impact** - includes the removal of significant disturbance natural areas resulting in the net loss of functions that cannot be mitigated within the study area. In particular, these include the loss or disturbance of features representing:
  - habitats of irreplaceable integrity that are critical to supporting living things that are considered significant
  - habitats which play a critical functional role (such as habitat linkage) that will disappear or be permanently
- **Low Impact** - includes partial removal or disturbance of natural areas, however impacts can be partially or completely mitigated and will not affect existing functions over the long term
- **Low Impact** - will not permanently change the existing quality or ecological function of natural area
- **Functions** - ground water, surface water, erosion control, habitat integrity reduced.

## QEW (from Centennial Parkway to Burlington Street)

### Impact (without mitigation)

#### Impact to Vegetation and Wildlife Habitat

- **Type and Amount Removed**
  - Open Space (Recreational Area - Maintained Sites) - 7.1 ha
  - Anthropogenic Woodland/Forest (Plantations & Cultural Woodlands) - 1.0 ha
  - Natural Woodland/Forest (Lowland, and Floodplain) - 1.14 ha
  - Successional (Old Field, Thickets and other Regeneration Areas) - 8.8 ha
  - Wetland (Marsh, Van Wagner's Point - Significant) - 0.5 ha
  - Aquatic (Open Water) - 0.11 ha

#### Type and Amount Potentially Disrupted

These values are anticipated to be low because of the existing impact QEW already exerts in this area

#### Impact to Significant Species

The following significant plant and wildlife species are associated with wetland and shoreline habitat

#### Plants

- total of 7 significant plant species are known to occur in this impact area
- 2 species are considered rare in the Region of Hamilton-Wentworth

- species are considered uncommon in the Region of Hamilton-Wentworth

#### Wildlife

Impacts to significant wildlife species include:

- 1 vulnerable bird species, the Least Bittern

#### Impact to Ecosystem Functions

High-level impacts will occur in portions of the study area associated with the Van Wagner's Marsh Wetlands. This is due to the removal of wetland area that affects significant wildlife and plant species

Low-level impacts are anticipated for areas located beyond the study area boundary and in existing severely degraded habitat adjacent to QEW and project construction



## Mitigation

Within the QEW area, the Landscape Restoration Plan will adhere to the following methods of impact mitigation:

**Protection & Conservation** - measures will be taken to protect and conserve existing natural habitats from the disturbances of QEW modifications and related works.

**Biodiversity Recycling** - terrestrial resources and habitat elements (i.e., plants, soil seedbank, stumps, rocks, organic matter, etc.) will be salvaged for eventual re-use near the QEW or other suitable areas.

**Habitat Enhancement & Creation** - Existing degraded habitats may be enhanced and new habitats may be created and/or restored to replace those removed by QEW modifications and related work.

Impacts to habitats known to support significant species will be mitigated using the following methods:

**Protection & Conservation** - measures will be taken to protect and conserve populations and habitats of significant plant and wildlife species.

**Biodiversity Recycling** - where possible, significant native plant species populations will be conserved through transplantation of living plant material, salvaged soil seedbanks, and/or through seed collection and plant propagation.

High-level impacts cannot be mitigated due to the magnitude of their effects in the landscape and the lack of opportunities to replace similar ecological functions elsewhere in the Watershed.

## Net Impact

**Habitat Management** - Certain specialized habitats (e.g., wetlands, etc.) will receive long-term management and monitoring to ensure their sustainability.

**Habitat Enhancement & Creation** - habitats known to support significant species of plants and wildlife will be recreated and/or restored to replicate favorable habitat conditions for the eventual recruitment of these species.

**Habitat Management** - certain specialized habitats (i.e., wetlands) will be subjected to long-term management and monitoring to ensure desirable conditions are created to sustain viable populations for significant plant species and habitats for significant wildlife species.

Will be determined after the Landscape Restoration Plan is completed.

High-level impacts sustained by the Provincially significant Van Wagner's Marsh wetlands include the loss of wetland area and removal of habitat for significant plant and wildlife species.

## Rationale:

The expressway and related works will eliminate existing habitats (i.e., their area and diversity), remove or displace habitat reliant on these habitats, and fragment habitats. Significant impacts to habitats, which are not directly removed, may be degraded or altered due to physical changes associated with the construction of the expressway. Significant impacts to species or habitats, which are those recognized as rare or particularly high quality on a regional or provincial basis, are indicators of environmental quality. The overall functions and integrity of the valley ecosystem will change during and following construction. Low to medium level impacts can be mitigated, but high level impacts will likely be permanent.

## Significance:

At the QEW, the Burlington Street reconstruction will further affect habitats used historically by waterfowl and shorebirds; previous works heavily impacted these habitats.

Mitigation options are being considered which could potentially offset several key impacts, particularly the loss of terrestrial and wetland habitats. These will be subject to physical feasibility, stakeholder acceptance and budgetary commitments.

## Information Source:

Dougan and Associates, Red Hill Creek Expressway Terrestrial Resources Technical Report, (Draft) June 1998.



# Consultation Plan

## CHAPTER 4

### 4.1

#### The Next Step

The next stage of the project (detail design) will further refine Expressway designs and mitigation strategies. For example, the location and design (height, colour, texture) of noise barriers will be developed at this stage. As well, the landscaping and restoration plan will show the types of plantings along the Expressway and the stream corridor

In order to develop these types of detail designs, input will be sought from those who have an interest in helping to further develop the mitigation. The following outlines the consultation plan that will be followed during detail design

The suggested groups/individuals/agencies are based on previous expressions of interest in the project obtained through consultation with the Community Stakeholder Committee, Government Agency Committee, public meetings and/or those who have directly contacted the Region.

### 4.2

#### Opportunities to Input to Detail Design

##### Trails and Pedestrian Crossings

The table indicates the type of trail/crossing and the groups/individuals/agencies who will be asked to participate in the design

##### Recreational Parks

In some areas, the Expressway, Burlington Street interchange, stormwater management, or the stream realignment may result in modifications to existing recreational areas. In order to develop mitigation that is appropriate, the following will be consulted in the development of mitigation

Trail Area/Pedestrian Access	Group/Individual/Agency
Bruce Trail relocation	Bruce Trail Association (Iroquois Club) City of Hamilton Parks Department Niagara Escarpment Commission
Red Hill Valley Recreational Trail Relocation	City of Hamilton Parks Department Hamilton Region Conservation Authority
Greenhill Pedestrian/Bike access to Valley	Local Schools & Parent Associations (east side) City of Hamilton Parks Department Regional Cycling Committee
Van Wagner's Marsh Internal Trail (relocation of connection to Beach at interchange)	Hamilton Region Conservation Authority City of Hamilton Parks Department
Barton Street bike/pedestrian crossing	Local schools & Parent Associations Regional Cycling Committee
Woodward Avenue (at QEW) bike/pedestrian lane	Regional Cycling Committee Local residents groups (Beach, Parkdale East)

Park Area	Group/Individual/Agency
Rosedale Baseball Diamonds	Rosedale Community Council City of Hamilton, Parks - Culture and Recreation Departments
Leaside Park	Local residents adjacent to the park City of Hamilton, Parks Department
Kings forest Golf Course	City of Hamilton, Golf Course Manager & Parks Department
Globe Park Baseball Diamond	Baseball Clubs, City of Hamilton Parks Department
Linear Park south of Woodward Avenue	Adjacent schools and residents, neighbourhood, City of Hamilton, Public Works Department
Glencastle Soccer Fields	East Hamilton Soccer Club, Adjacent Residents City of Hamilton, Parks - Culture and Recreation Departments

### 4.1

#### The Next Step

### 4.2

#### Opportunities to Input to Detail Design

## (4.2) Opportunities to Input to Detail Design

### Wildlife and Plant Habitat

The Expressway will displace several hectares of habitat. Much of this habitat cannot be replaced but there are several areas where there are opportunities to enhance existing green space. In developing a landscaping and restoration plan there will be a need to consult with several different types of people from staff at agencies to local residents.

### Noise walls

This stage of the project clearly indicates where noise walls should be considered based on predicted noise levels. The next stage of the project will examine where noise walls can feasibly be built.

In all discussion about noise barriers the adjacent residents or schools will be consulted. Since noise barriers are only effective where there is a continuous barrier, it will be important that all adjacent residents participate in this discussion.

### Air Quality

There are two aspects to air quality that will likely require further work:

- 1) understanding the potential health implications of the air quality assessment and what it means for local residents and users of recreational areas; and
- 2) the proposed mitigation for air quality (street cleaning and reforestation where possible). The Region will:
  - request the Hamilton Air Quality Initiative study team\* to review the results of the studies and provide comments;
  - review the studies with the Ministry of Environment and the Regional Health Department;
  - keep area residents informed of the results when they become available.

### Fish & Fish Habitat

The stream realignment work will require close liaison with the federal Department of Fisheries and Oceans throughout the detail design and construction as well as the Ministry of Environment depending on the construction techniques used. In addition, the City of Hamilton, Kings Forest Golf Course and Parks Division will be involved. The Ministry of Natural Resources will be kept informed as per their request.

### Water Quality and Quantity

The Region will work with the Ministry of Environment to obtain the required permits for the stormwater management and drainage of the Expressway.

### Archaeology and Cultural Heritage

The Region will continue to work with the Ministry of Citizenship, Culture and Recreation to ensure that appropriate protocols continue to be followed. There will be aboriginal consultation prior to excavation on aboriginal sites. Where excavation occurs on Ministry of Transportation (MTO) land, the MTO archaeologist will be consulted. The Region would appreciate any input from the public on appropriate repositories (areas for display) for archaeological artifacts found on Regional property. The Ministry of Transportation is responsible for artifacts found on their property.

#### Area for Restoration/Landscaping

Mount Albion Cemetery  
Niagara Escarpment Crossing area

Glencastle Playing Fields

Greenhill Avenue interchange,  
design and landscaping

Gateway treatments at Interchanges at King  
Street, Queenston Road and Barton Street  
Top of East bank of Valley from Queenston  
to Barton Street

Brampton Lindhill Site Reforestation

Van Wagner s/Red Hill Marshes

MTO vacant land reforestation (at QEW)

Plant restoration and salvage associated  
with the stream realignment

#### Group/Individual/Agency

Ministry of Culture, Citizenship and Recreation  
Niagara Escarpment Commission  
City of Hamilton, Parks Department  
Adjacent residents, neighbourhood soccer  
clubs, City of Hamilton

Adjacent residents & neighbourhood  
City of Hamilton Traffic Department,  
local schools and School Boards

Adjacent residents and neighbourhood, City of  
Hamilton Traffic Dept., School Boards  
Adjacent residents,

City of Hamilton, Parks Department  
Regional Environment Department,  
City of Hamilton, Parks Department  
Hamilton Region Conservation Authority,  
Ministry of Natural Resources,  
Department of Fisheries and Oceans  
MTO,

City of Hamilton, Parks Division  
Department of Fisheries and Oceans,  
Ministry of Natural Resources,  
City of Hamilton Parks Department

\* All sites Landscape and Restoration Advisory Group

\* The Landscape and Restoration Advisory Group includes local representatives from agencies or companies with landscaping and/or restoration expertise, particularly with native plants

- Remedial Action Plan, Fish and Wildlife Habitat Restoration Project
- Royal Botanical Gardens
- Hamilton Region Conservation Authority
- Watershed Stewardship Program
- Local nurseries (Common Nurseries representing Landscape Ontario, Wetland Specialists)
- Ministry of Natural Resources
- City of Hamilton Parks Division

# Project Map

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#### NEW CREEK AND FLOODPLAIN ALIGNMENT

- exact width of floodplain to be determined in detail design phase
- location of floodplain and creek within floodplain to be adjusted to suit existing vegetation and site features
- floodplain may require regrading and revegetation in some areas

#### GOLF COURSE BRIDGES

- determine where bridge replacements are required
- new bridge designs to be determined

#### GRASS MEDIAN

- incorporate stormwater management element

#### STORMWATER CONTROL AREA

- stores rainfall up to a 100 year storm event for several hours
- remains dry at other times

East-west expressway  
alignment

#### ESCARPMENT CROSSING

- expressway at this point includes four lanes and one climbing lane
- on/off ramps to Mud Street
- as a result of visual impact assessment, the crossing area design is being re-examined

#### MUD STREET INTERCHANGE

- second phase of work
- completion of connection to Paramount Drive

Glencastle Park

Mount Albion Road

New street design

Existing C.S.O. discharge

Pedestrian access to  
valley across bridge

#### KING STREET INTERCHANGE

- extend Mount Albion Road to Lawrence Road
- remove concrete saddle across creek

#### STORMWATER CONTROL AREA

- stores rainfall up to a 100 year storm event for several hours
- remains dry at other times

Lawrence Road

King Street

# RED HILL CREEK EXPRESSWAY

## North/South Section - Project



**Region of Hamilton-Wentworth**  
Transportation Department, Special Projects Office



### LEGEND

- Expressway
- C.S.O. (Combined Sewer Overflow Pipe)
- Creek Alignment
- Storm Water Management Pond
- Road Closure
- Bridge
- Culvert



# Impact Map

Red Hill Creek Expressway  
North/South Section



#### ESCARPMENT CROSSING AND SAND SCARPS

- reduction of critical wildlife corridor function (habitat linkage)
- removal of significant Escarpment forest, meadow habitat and associated wildlife
- barrier to wildlife movement

#### TRAIL IMPACTS

- Bruce Trail discontinued through expressway corridor
- loss of temporary trails through expressway areas from Greenhill to Q.E.W.
- loss of trail connections to and through valley
- disruption to existing trail heads

#### RECREATIONAL IMPACTS

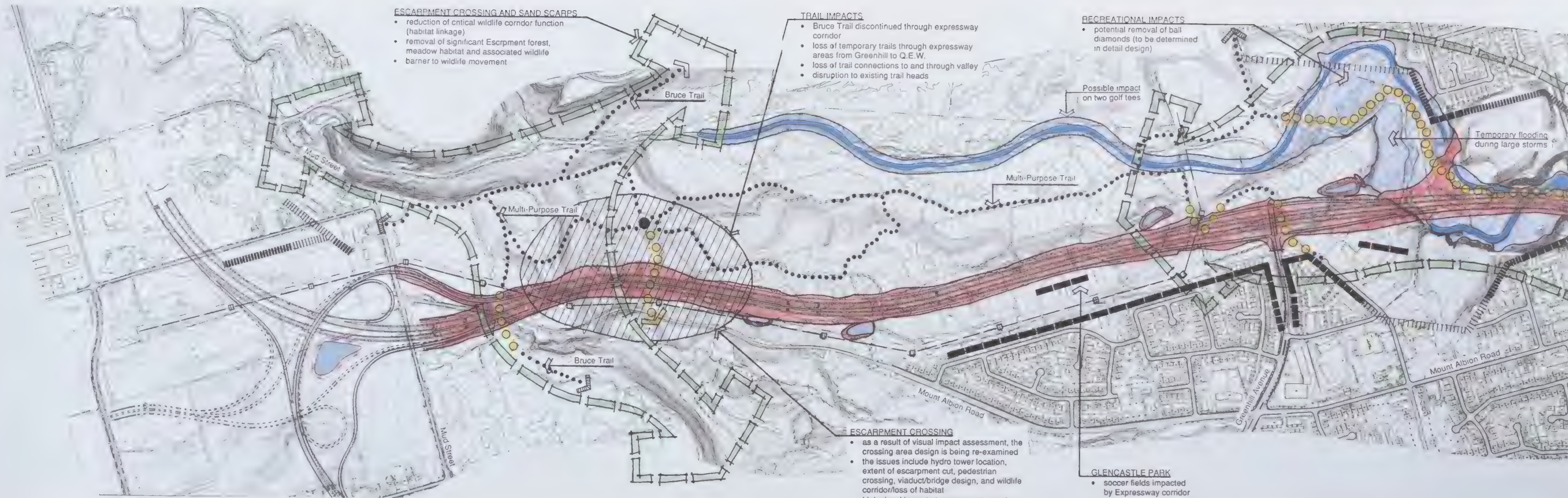
- potential removal of ball diamonds (to be determined in detail design)

#### ESCARPMENT CROSSING

- as a result of visual impact assessment, the crossing area design is being re-examined
- the issues include hydro tower location, extent of escarpment cut, pedestrian crossing, viaduct/bridge design, and wildlife corridor/loss of habitat
- high visual impact at escarpment crossing

#### GLENCASTLE PARK

- soccer fields impacted by Expressway corridor alignment and noise



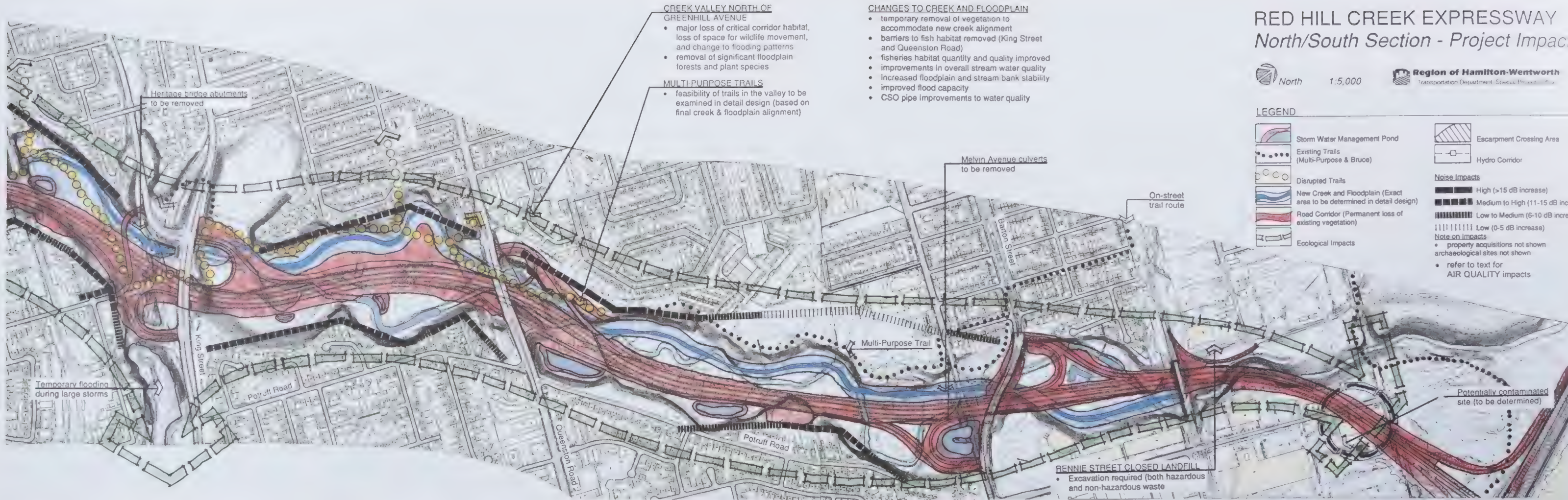


# RED HILL CREEK EXPRESSWAY North/South Section - Project Impacts

North 1:5,000 Region of Hamilton-Wentworth Transportation Department Special Projects Unit

## LEGEND

- |  |   |   |                                    |
|--|---|---|------------------------------------|
|  | Storm Water Management Pond   |   | Escarpment Crossing Area           |
|  | Existing Trails (Multi-Purpose & Bruce)                                 |   | Hydro Corridor                     |
|  | Disrupted Trails  | <b>Noise Impacts</b>                    |                                    |
|  | New Creek and Floodplain (Exact area to be determined in detail design) |   | High (>15 dB increase)             |
|  | Road Corridor (Permanent loss of existing vegetation)                   |   | Medium to High (11-15 dB increase) |
|  | Ecological Impacts  |   | Low to Medium (6-10 dB increase)   |
|  |   |   | Low (0-5 dB increase)              |
|  |   | <b>Note on Impacts</b>                  |                                    |
|  |   | • property acquisitions not shown       |                                    |
|  |   | • archaeological sites not shown        |                                    |
|  |   | • refer to text for AIR QUALITY impacts |                                    |



- CREEK VALLEY NORTH OF GREENHILL AVENUE**
- major loss of critical corridor habitat, loss of space for wildlife movement, and change to flooding patterns
  - removal of significant floodplain forests and plant species
- MULTI-PURPOSE TRAILS**
- feasibility of trails in the valley to be examined in detail design (based on final creek & floodplain alignment)

- CHANGES TO CREEK AND FLOODPLAIN**
- temporary removal of vegetation to accommodate new creek alignment
  - barriers to fish habitat removed (King Street and Queenston Road)
  - fisheries habitat quantity and quality improved
  - improvements in overall stream water quality
  - increased floodplain and stream bank stability
  - improved flood capacity
  - CSO pipe improvements to water quality

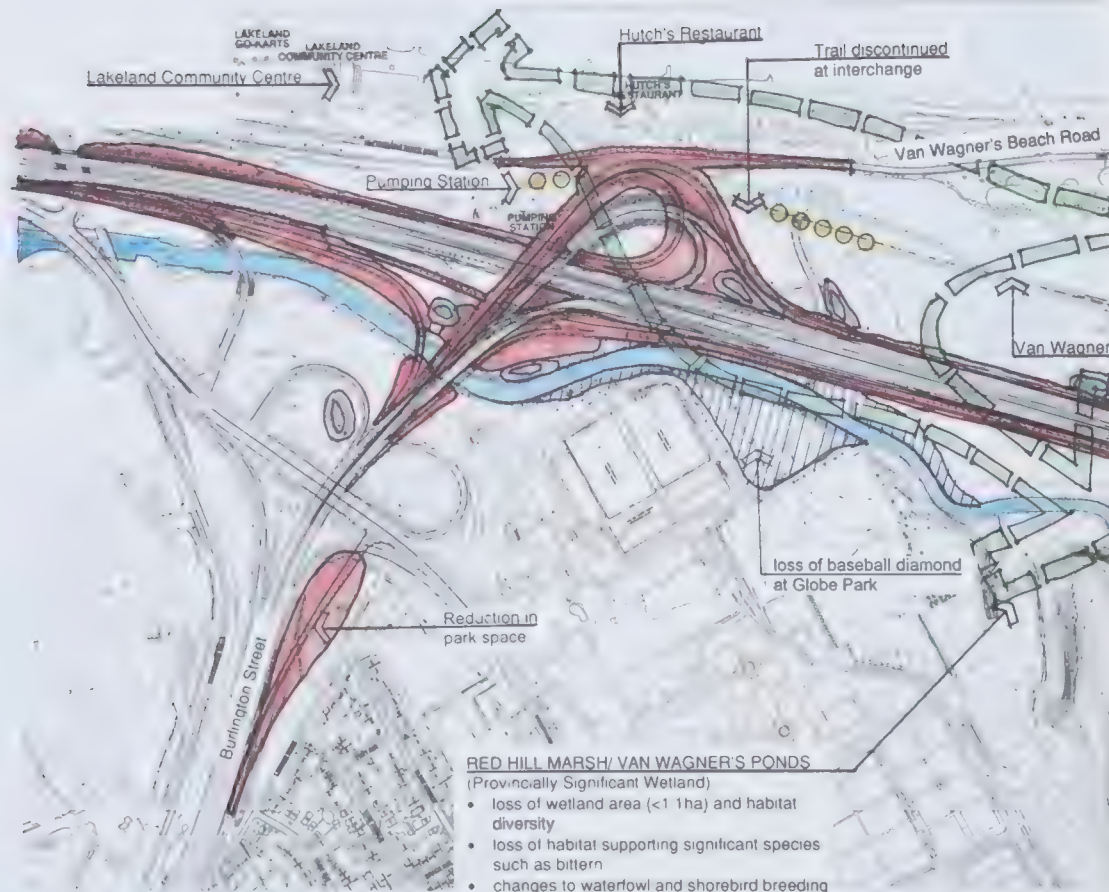
- RENNIE STREET CLOSED LANDFILL**
- Excavation required (both hazardous and non-hazardous waste)



# Impact Map

QEW Section





# RED HILL CREEK EXPRESSWAY Q.E.W. Section - Project Impacts



North

1:5,000



**Region of Hamilton-Wentworth**  
Transportation Department, Special Projects Office



## LEGEND



Storm Water Management Pond



Existing Trails  
(Multi-Purpose & Bruce)



Disrupted Trails



Old creek and new floodplain  
(area to be determined in detail design)



Road Corridor (Permanent loss of  
existing vegetation)



Ecological Impacts



Escarpment Crossing Area



Hydro Corridor

## Note on Impacts

- property acquisitions not shown
- archaeological sites not shown





# Mitigation Map

Red Hill Creek Expressway  
North/South Section

### ALL INTERCHANGES

- landscaping to reflect transition from urban to valley landscape
- urban design considerations lighting street trees bridge crossings railings etc.

### VALLEY SLOPES

- where possible maintain existing woodland vegetation
- opportunities to enhance diversity
- enhance slope stability

### RESTORATION OF STREAM CHANNEL

- planting along creek edges
- seeding and/or planting within floodplain zone in those areas where regrading of flood plain is required

### NIAGARA ESCARPMENT GATEWAY

#### CROSSING OBJECTIVES

- maintain an ecological link along the escarpment
- establish a new trail connection for Bruce Trail
- minimize visual and ecological impact of crossing

### GOLF COURSE

- possible relocation of two golf tees
- re-build bridges across realigned creek

### RELOCATION OF 1 or 2 BALL DIAMONDS REQUIRED

- input from community and special interest groups

Relocate C.S.O. discharge stream

Bruce Trail

Multi Purpose Trail

Mud Street

### INTERSECTION AT MT. ALBION ROAD

- investigate retaining road remnants as a cultural landscape feature

### GRASSIE BLACKSMITH SHOP

- investigate its use as a hiking shelter, forming part of a rehabilitated trail system

### MOUNT ALBION CEMETERY

- landscape design to be approved by Ministry of Culture, Communications and Citizenship

Bruce Trail

### HABITAT OPTIONS

- maintain butterfly meadow
- create forested area and visual buffer

Potential to re-establish linear perched wetland

Steep slopes to be revegetated

Mount Albion Road

### GLENCASTLE PARK

- visual screening and/or buffer planting
- input from community

Potential to incorporate existing tree nursery into open space

Visual screening and/or buffer planting

### VISUAL SCREENING/BUFFER PLANTING

- input from schools and community

### GREENHILL AVENUE

- create a streetscape design for existing and proposed sections of Greenhill Avenue, incorporating principles such as traffic calming
- ensure safe crossing for school children at Glenvista Drive and Harrisford Street intersections
- possible bicycle lane along road to be confirmed
- valley access from school yard at Greenhill Avenue

Greenhill Avenue

Trail corridor to be restored



Re-establish woodland vegetation on berms after completion of grading for stormwater retention area

Creek and trail crossing to be resolved



**KING STREET INTERCHANGE**

- woodland vegetation to create visual link between Red Hill Creek valley and Davis Creek valley
- existing pedestrian underpass

**HIXON ROAD BRIDGE ABUTMENTS**

- position stormwater management facility to avoid interference with old bridge abutments

**EXPOSED BEDROCK - QUEENSTON SHALE**

- steep slope with escarpment like conditions

**LINEAR URBAN PARK**

- input from community

**BARTON STREET INTERCHANGE**

- new bridge across valley
- bicycle and pedestrian lane to provide safe crossing for school children

**PROPOSED WOODLAND BUFFER**

- screen views from residences
- input from residents

**FISHERIES IMPROVEMENTS**

- remove concrete saddle for fish migration
- modify culvert for fish passage

**DAVIS CREEK**

- temporary stormwater storage area retaining storm water up to a few hours

**WOODLAND BUFFER**

- screen views from residences
- input from residents

**FISHERIES IMPROVEMENTS**

- remove concrete channels

**OPEN SPACE**

- potential for additional woodland buffer
- input from community

**STEEP SLOPES**

- soil conditions to be evaluated for restoration potential

**RENNIE STREET LANDFILL**

- waste management required
- further site management investigation required



1:5,000

**Region of Hamilton-Wentworth**  
Transportation Department, Special Projects Office

**LEGEND**

	Woodland		Existing Creek
	New Woodland Planting/ Visual Buffer		Proposed Creek Alignment
	Creekside Planting		Storm Water Management Ponds
	Meadows		Existing Trails
	Exposed Bedrock		Proposed Trails
	Steep Slopes for Revegetation		Gateway
			Noise Wall Studies





# Mitigation Map

QEW Section

#### HIGHWAYS

- opportunity to visually screen
- design with input from Hutch's Restaurant

#### WOODWARD AVENUE AND Q.E.W.

improved bicycle and pedestrian access

#### FISHERIES HABITAT CREATION

- lowering of floodplain

#### OPTIONAL LOWERING OF FLOODPLAIN

- creation of new wetland
- new fish habitat

#### PARK SPACE

- redesign with input from residents



# RED HILL CREEK EXPRESSWAY Q.E.W. Section - Project Mitigation



1:5,000



**Region of Hamilton-Wentworth**  
Transportation Department, Special Projects Office

## POTENTIAL WETLAND ENHANCEMENT

- undulate shoreline to provide better habitat for wetland
- create shallow slopes for emergent vegetation
- incorporate logs for turtles

## POTENTIAL HABITAT IMPROVEMENTS

- design with input from residents

## CONFEDERATION PARK

- visually screen expressway
- redesign with input from Conservation Authority

## LEGEND

	Woodland
	New Woodland Planting/ Visual Buffer
	Meadows
	Habitat Improvements
	Fisheries Habitat Creation
	Storm Water Management Pond
	Existing Creek
	Wetlands
	Optional Lowering of Floodplain
	Gateway
	Noise Wall Studies

## EXISTING FORESTED CREEK EDGES

- opportunity to modify topography in order to create more diverse habitat

## EXISTING REMNANT WOODLOT

- maintain periodic flooding
- maintain drainage connection to Confederation Park

## GATEWAY TO RED HILL CREEK EXPRESSWAY

- potential for woodland and feature planting areas





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If you have any questions or comments, please contact Chris Murray,  
Environmental Planner, Special Projects Office, The Regional Municipality of  
Hamilton-Wentworth, at:

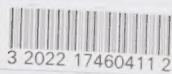
Special Projects Office  
10th Floor, 25 Main Street West  
Hamilton, Ontario L8P 1H1

Tel: (905) 546-2486

Fax: (905) 546-2385

E-Mail: [cmurray@hamilton-went.on.ca](mailto:cmurray@hamilton-went.on.ca)





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